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# ORIGINAL ARTICLES

## THE LIFE AND WRITINGS OF HIPPOCRATES*

### A SKETCH

BY F. B. LUND, M. D.

IT is an interesting fact that the culmination of the Age of Pericles should have coincided with the life of Hippocrates of Cos. That most remarkable period in human history, when, in a few hundred years, Poetry, Philosophy, Political Science and the Plastic Arts burst into bloom, was also the period which saw the foundation of medicine. The poetry and sculpture of the Greeks have a serene loveliness that has never been surpassed. The writings of the great father of medicine, from the point of view of medical ethics, nay even for serenity and common sense, have perhaps never been surpassed during the succeeding twenty-five centuries which have intervened. Which is the more remarkable because his writings are the very earliest essays which have come down to us on medical subjects. He wrote on "Ancient Medicine, "Regimen in Acute Diseases," "Prognosis," the "Sacred Disease" (Epilepsy), and covered the field of the surgery of his day by dissertations on "Fractures," "Dislocations," "Wounds," "Injuries of the Head," "Ulcers," "Hemorrhoids," and "Fistulae." Above all, he laid the foundation for medical ethics in the Hippocratic "Oath." This document has a moral grandeur which makes a model for us today. With the Hippocratic "Oath" and the Hippocratic "Facies" we are all familiar. I wonder how much we know about his other writings. He also wrote our first work on Climatology, "Airs, Waters and Places," gave the first account of certain epidemics, one of mumps, others of malaria, erysipelas and phthisis. By the way, he wrote that phthisis was contagious, while malaria was not. He gave to the world the first case histories which have come down to us in literature. These histories are not taken according to formulas of the American College of Surgeons. We do not get the patient's street and number, or always the exact age. The patients are identified as "the maiden who lay sick by the sacred way," or "the man of Clazomenae who lay sick by the well of Pherecydes," and sometimes the age is mentioned casually at the end, as "died being about twenty years old." But they are faithful records of the symptoms as observed. They were probably not intended for publication or prepared for it by the hand of their author. They may have been notes intended for personal use or for lectures in the medical school at Cos, and were found among the papers of the school and "given to the press," so to speak, after the death of their writer. It is interesting to read both the accounts of the epidemics and the case histories, and one can often make a diagnosis after twenty-five hundred years from old Hippocrates' notes. I wonder if after two or three centuries people will be looking over Cabot's case histories and remarking on the crude state of medical science when these were written?

Two or three little essays on "Medical Conduct" (Decorum) and the "Law" are of great interest for their common sense and fine ethical feeling. The relations between doctor and patient were the same two thousand years ago as they are today. The golden rule also has not changed in the interval; the acute mental vision and fine feeling of the Greeks made possible the establishment of model principles for the relation of doctor and patient, which will last as long as humanity. There are certain broad therapeutic principles which have not been changed; for instance, barley broth of various strengths was the foundation of a diet in acute disease then, as it is in many conditions now. The mechanical principles in the reduction of fractures and dislocations have not changed. Being up against the same problems that we are, they met them in the same way. Hippocrates would reduce a dislocation of the hip or shoulder very much as we would today. He applied the principles of extension in fractures as we do, and devised much apparatus for the purpose. The bones united in the same number of days, according to his statement, as they do now. Certain questions which are still under discussion today were mooted in Hippocrates' time; for instance, whether to trephine in contusions of the skull when the patient was unconscious, but when there was no actual evidence of fracture. It is interesting that old Hippocrates voted in the affirmative on this question.

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*Presidential address before the New England Surgical Society, Hartford, Conn., September 26, 1924.

One of the mighty builders of his age, he laid his foundations four-square, that the subsequent structure of medical science might be built upon them. The foundations were laid upon the principle of accurate, empirical observation, which had to serve alone down to the very threshold of our own time. Using what anatomy* he could find out on animals and in the living, what climatology he could gather from extensive travel, what knowledge by patient observation, inspired by kindness of heart and a fine sense of gentle and just behaviour, he built his structure firmly and well. Did he foresee the future progress of medical science? He did, and this is what he said about the lines which it must follow. (Quotation from Ancient Medicine): "But medicine has long had its means to hand, and has discovered both a principle and method, through which the discoveries made during a long period are many and excellent, while full discovery will be made, if the enquirer be competent, conduct his researches with knowledge of the discoveries already made, and make them his starting point. But any one who, casting aside and rejecting all these means, attempts to conduct his researches in any other way or after another fashion, and asserts that he has found out anything, is and has been the victim of deception." Our author studied the human physiology in health, and reasoned wisely from the effects of various diets and regimen in health to their employment in disease. He took hints from the stories of patients, from old records in the Temples of Aesculapius, from general experience, and combined them with the results of his own observation to make up his system of treatment.

Now for a few facts which are illuminating in regard to the effect on the character and life of Hippocrates of the times in which he lived. He was born in the Ionian Island of Cos, in the first year of the 80th Olympiad, or 460 B. C. Therefore, for three hundred years at least, the Greeks had had experience in training athletes for the Olympic games, and the medical practice of Hippocrates' day had had the benefit of the accumulated knowledge of principles of training for health and activity, which was handed down through these generations. He belonged to the family of the Asclepiadae, by whom the practice of medicine was passed down from father to son, and by whom its traditions were preserved and maintained. Plato calls them the "Kompsous Asclepiadas," which might be translated as the "dandy sons of Aesculapius," referring to their care of their personal appearance, or might mean "those fine fellows, the Asclepiadae." Hippocrates' father was a distinguished physician, Heraclides, and he had two sons, one of whom, Thessalus, was physician to Archelaus, king of Macedon. A son and grandson of this Thessalus were physicians to Roxana, the wife of Alexander the Great.

A few of the events with which his life coincided: The battle of Marathon, "that first fiery rapture of the infant democracy of the early world," was fought thirty years before Hippocrates was born. "He had listened to the story of Thermopylae, and Salamis, and Plataea, from the living lips of the survivors of these glorious fields, and had been told as he stood at his mother's knee of that day of humiliation when the Persian Monarch with the kings of Tyre and Sidon held their synod in the Acropolis of Athens, to deliberate upon the fate of Greece, and to partition among themselves and their allies its subject territories."

The first thirty years of his life were in the age of Pericles, when the architectural wonders of the Parthenon had "no spot upon the whiteness of their Pentelic marble, and no one of the sculptures and decorations was touched by the fingers of time." The great gold and ivory statue of Athena by Phidias was dedicated when he was twenty-three years of age. Aeschylus, the greatest tragic poet the world has ever seen, died when Hippocrates was in his childhood. Sophocles was thirty-seven, and Euripides twenty-five years his senior. Anaxagoras was forty years older, Socrates ten years older, and Democritus one year younger than Hippocrates. Herodotus was twenty-four, and Thucydides eleven years his senior, and Xenophon was fifteen years younger than he. Pericles died when he was thirty years old, and the second period of his life may be said to extend from this date to the close of the fifth century B. C., or a little later, to the death of Socrates, that "sublime tragedy in the history of humanity." During this period the Hellenic world was torn and distracted by the Peloponnesian war. The first comedy of Aristophanes was exhibited two years after the death of Pericles, when Hippocrates was thirty-three years old. The third period of his life, from the close of the Peloponnesian war to his own death at the age of eighty-five years, was made immortal by the sublime teaching of Plato, and its close lighted up by the rising sun of Aristotle. The father of Demosthenes died when he was eighty-two and he may have heard "the broken practice of that boyish voice whose puny utterance was afterward to stir the hearts of his countrymen like the call of the trumpet to battle."

The influence of the Greek religion upon the medical thought of the time must not be forgotten in our estimate of Hippocrates and what he stood for. We have our troubles with Osteopaths, Chiropracters, and Christian Scientists, but what if we had been up against the dream oracles of the great God Esculapius? After the cult of Esculapius was established, and long before Hippocrates' time, the great temples of Esculapius at Epidaurus, Tricca, Athens, and

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*The study of anatomy upon the dead was precluded among the ancient Greeks by their religious beliefs. They believed that the souls of the dead were obliged to wander about miserably in Hades and could not cross the Styx until their bodies were either buried or burned.

Cyrene, like Lourdes of our day, were resorted to by multitudes of sufferers, who went there to pray and pay the liberal honorarium to the God, and to sleep for the night in the awful abaton, the holy precinct of the temple, where they were cured by oracles delivered to them in dreams. At first, these oracles were curious and mystical, but later it is noted that the priests of Aesculapius acquired a certain knowledge of the healing art, that the temples were situated in well watered, salubrious, shady groves, and that the dreams came to suggest matters of diet, regimen and medication, which were well adapted to the cure of the sick. To the credit of the School of the Asclepiadae at Cos, of which our author was the great ornament, is the fact that after his time they dealt not in dreams, but in carefully considered dietetic, climatic, medical, and surgical therapy. Though they were members of the Asclepiadae, they were not priests but physicians, and did their work outside the temple of Aesculapius. In Aristophanes' comedy of Plutus, we get a side light on what must have been the troubles of the practicing physicians of Hippocrates' time. When Chremylus wants the God Plutus cured of blindness, his friend remarks, "Why don't you take him to a doctor?" His answer is: "There is neither a real doctor in the city, nor yet the money to pay him. "Let's see if we can't find one." "No, we'd better put him to sleep in the temple of Aesculapium." Which was done, his eyes were licked by the sacred serpents, and he was cured.

There is no doubt that the Greek physicians had their offices, or "Iatreia," and in a work on "The Surgery," Hippocrates gives many wise and careful directions about the conduct of operations, position of the operator and patient, the apparatus for retaining fractures, and the application of bandages. In describing bandages as applied to the nose, (Fractures,) he makes the point that a figure-of-eight bandage ordinarily applied with the crossing on the bridge of the nose, may look well, but it tends to produce and maintain depression, and should not be used. He advocates elevating nasal fractures by introducing an instrument into the nose for the purpose, as we do today. In his long work on fractures there is an interesting discussion of compound fractures of the femur. Only those of us who are old enough to remember the pre-antiseptic times, when compound fractures of the femur meant immediate amputation to avoid sepsis and tetanus, can appreciate the conditions under which he worked. In compound fractures of the femur, Hippocrates advocates reduction if possible, even if one has to saw off the projecting ends of the bones to accomplish it, but states that reduced or unreduced, they do badly, so that in his words, "It's far better to avoid these cases if one can do so gracefully, for there is little hope of a good result, and the dangers are many." In the treatment of compound fractures he used to pry the bones in place, and had steel instruments made for the purpose.

A brief, and I believe accurate, statement of the scope of Hippocratic surgery may here be of interest. "They reduced fractures and dislocations; they applied the apparatus necessary to retain the displaced parts; they resected the ends of projecting bones in compound fractures, they trepanned the bones of the cranium, and the ribs even, to evacuate fluids accumulated in the chest; they performed the operation for paracentesis of the chest and abdomen; they opened abscesses of the kidneys and the liver; they operated for fistulae in ano and for hemorrhoids; they cauterized the shoulder to prevent the recurrence of certain scapulo-humeral dislocations; they adjusted club feet; they sounded the bladder; they amputated the dead portion of gangrenous limbs; they rasped the bones of the cranium; they extricated the dead fetus from the uterus."

In a special work under the title of "Prognosis," our author emphasizes the importance of this faculty to the practitioner and the patient. He says: "It seems to me most important for the physician to interest himself in prognosis, for if he can discover and relate at the patient's side the present condition, past symptoms and future course, and supply the deficiencies in the patient's own account of his symptoms, patients will confidently entrust themselves to his care. A foreknowledge of the future course of the disease in the light of the present condition will also be of the greatest assistance in treatment." In the treatise on "Regimen in Acute Diseases," he criticizes the Cnidian School (a celebrated school on the island of Cnidus, about one hundred and thirty-five miles from Cos), for paying too little attention to prognosis and too much to unessential details, especially in the classification of diseases, holding that a difference of symptoms constituted a different variety of disease. The regimen in acute diseases was mild, cautious, and carefully changed according to the developments in the case. The humoral pathology, the doctrine that health consisted in a proper crasis or mixture of the hot, cold, wet or dry humors of the body, the blood, mucus, red bile, and black bile, and disease in the prevalence of one or the others, was of course wrong, but lasted as we know, well down to our own times. The "coction" or digestion of the humor that was "on the loose," so to speak, and making trouble, was necessary before the proper adjustment could take place, and when this did take place the crisis of the disease occurred. And yet our author in his treatise on "Ancient Medicine" expressly combats a too strict adhesion to the principles of the humoral pathology in matters of therapeutics, such as giving only hot drinks without other medicinal value in cold conditions, and cold drinks in fevers, without reference to the condition of the stomach or to the careful choice of the potion for its other effects on the disease. Whenever common sense is needed, our author seems to be there in person.

In an address so short as this, it is useless to try to be thorough. I must, however, give you a translation of a few sentences from the "Prognosis," to show what sort of an observer our author was. After stating that in acute disease we must carefully observe any change from the appearance of the patient in health, he goes on to describe the condition which is "most different from health and of most serious import,—nose sharp, eyes hollow, temples sunken, ears cold and contracted, with their lobes turned outward, and the skin about the face hard, tense, and parched,"—(the so-called Hippocratic facies). As to the motions of the arms in acute fevers, etc., "if they move before the face, hunt in the empty air, pluck nap from the bedclothes, pick up bits, and scratch chaff from the walls, all these signs are bad, in fact deadly." Compare King Henry V, Act II, Scene III, when the hostess says of the dying Fallstaff: "for after I saw him fumble with the sheets, and play with flowers, and smile upon his finger's ends, I knew there was but one way, for his nose was as sharp as a pen, and a' babbled of green fields."

A quotation worth remembering from the treatise on the "Sacred Disease" (Epilepsy): "This is my opinion about the sacred disease, so-called. It is not in my opinion any more sacred or divine than other diseases, but has a natural cause, and its supposed divine origin is due to men's inexperience, and their wonder at its peculiar character. Now while this belief in its sacred origin is nurtured by their failure to understand it, it is really disproved by the facile method of healing, which consists of incantations and purifications. But if it is to be considered divine just because it is wonderful, there should be many sacred diseases instead of only one, for I will show that other diseases are no less wonderful and portentous, although no one considers them sacred." For our author everywhere and consistently maintained the doctrine that each disease had its own nature, and could not arise without natural causes.

From the "Precepts," which, from reasons of style, etc., probably was not written by the "Great Hippocrates," I must include a statement of the ethics which prevailed among the best of the Greek physicians. The writer is talking about the behaviour which a physician should observe when just called to a new patient. "Should you begin by discussing fees, you will suggest to the patient either that you will go away and leave him if no agreement be reached, or that you will neglect him, and not prescribe any immediate treatment, so one must not be anxious about fixing a fee. For I consider such a worry to be harmful to a troubled patient, especially if the disease be acute. For the rapid progress of the disease offering no opportunity to turn around, should influence a good doctor not to seek his profit, but to hold fast to his reputation, rather than extort money from those who are at death's door." Again, from the same: "I urge you not to be unkind but to consider carefully your patient's superabundance or means. Sometimes give your services for nothing, calling to mind a previous benefaction or present satisfaction. And if there is an opportunity of serving one who is a stranger in financial straits, give full assistance to all such. For where there is love of man there is also love of the art"; or as it might be rendered: The love of the real art of medicine presupposes and includes philanthropy, or the love of mankind.

I am able to quote so little, but hope I have given enough to show why the Hippocratic writings have come down to us in literature. Take the first of the "Aphorisms." "Life is short, art long, opportunity fleeting, experiment dangerous, decision difficult." Echoed in the first century, A. D., in Seneca: "Ars longa, vita brevis," and in the nineteenth, in Wagner's cry, in the first scene of Goethe's Faust: "Ach Gott die kunst is lang und kurz is unser leben."

The last of the "Aphorisms": "What medicine cures not, the knife cures; What the knife cures not, the fire cures; What fire cures not, must be regarded as incurable." If we include in "fire" the use of X-ray and radium, which are certainly applications of fire in a broad sense, how well that applies to cancer at the present day.

Another of the "Aphorisms" has entered into the so-called controversy between Allopathy (atrocious term), and Homeopathy. It is this, —Aphorism II, 22,—"Diseases which arise from repletion are cured by depletion, and those which arise from depletion are cured by repletion, and, in general, diseases are cured by their contraries, or in Latin,—(contraria contrariis curantur). Hahneman, the founder of Homeopathy, stated that this was the principle of "allopathic" treatment. ("Alloios" is the Greek word for contrary, and "homoios" for similar.) On the other hand, the homeopathic principle, so-called, may be supported from the Hippocratic writings in the treatise on the "Places in Man": "Through the similar, disease arises, and by the similar, when it is prescribed, men are cured of their diseases." He goes on to speak of instances, closing,—"so that cures are accomplished by both opposed methods of treatment. And in general it may be said that one disease can be cured by means which are opposite to its nature and cause, and another by means which are similar to them."

Our author was a great traveler and spent large portions of his life in Cos, Thasus, Abdera, Athens, and several other cities. He is believed to have attended that prince of statesmen, Pericles, when he died of the plague at Athens. It has been stated that he made suggestions which were effectual in bringing that awful devastation to a close. We do not know. He died at Larissa in Thessaly, which was the scene of much of his professional activity.

I cannot close before quoting from the little extract which is entitled the "Law" or "Nomos": "Whoever is to acquire a competent knowledge of medicine ought to have the following advantages: a natural disposition, instruction, a favorable situation for study, early tuition, love of labor, leisure. First of all, a natural talent is required, for when nature opposes, everything else is in vain. Nature is the guide to the best practice, and instruction in the art follows, which the student must cultivate by reflection, and must early become a pupil in a place well suited for instruction. He must also bring to the task a love of labor and perseverance, so that his knowledge may take root and bring forth proper and abundant fruits." I am reminded of the words of my old Professor of Surgery, Dr. David Cheever, in his advice to young physicians: "Choose your place and stick. Work all the time. Always work."

An amusing quotation from "Concerning the Physician": "The dignity of a physician requires that he should look healthy, and as plump as nature intended him to be" (I think most of you whom I see before me would come up to the requirement), "for the common crowd consider those who are not of this excellent condition to be unable to take care of others. Then he must be clean in person, well dressed, and anointed with sweet-smelling unguents that are not in any way suspicious," (Tobacco was unknown to the Greeks) and goes on to give excellent rules of behaviour and conduct.

In the old days there seems to have been no Board of Registration in Medicine. This is what the little treatise "Nomos" says about the necessity of such a law: "Medicine is the most distinguished of all the arts, but through the ignorance of those who practice it and of those who casually judge such practitioners, it is now of all the arts by far the least esteemed. The chief reason for this error seems to me to be this: Medicine is the only art which our states have made subject to no penalty save that of dishonor, and dishonor does not wound those who are compacted of it. Such men in fact are very like the supernumeraries in tragedies. Just as these have the appearance, dress, and mask of an actor without being actors, so too with physicians, many are such by repute, but few in reality."

I begin to fear that you have had all you can stand of this, but before closing I must read you the "Oath," so that again you may remember how worthy was the ideal of conduct which our old father of medicine set up, and may rejoice in the thought that through so long a period of time the profession of medicine have made it their ideal:

"I swear by Apollo, the physician, and Aesculapius, and Health, and All-heal, and all the gods and goddesses, that, according to my ability and judgment, I will keep this Oath and this stipulation: to reckon him who taught me this Art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required; to look upon his offspring on the same footing as my own brothers, and to teach them this Art, if they shall wish to learn it, without fee or stipulation; and that by precept, lecture, and every other mode of instruction, I will impart a knowledge of the Art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath according to the law of medicine, but to none others. I will follow that system of regimen which, according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give no deadly medicine to any one if asked, nor suggest any such counsel; and in like manner I will not give to a woman a pessary to produce abortion. With purity and holiness I will pass my life and practice my Art. I will not cut persons laboring under the stone, but will leave this to be done by men who are practitioners of this work. Into whatever houses I enter, I will go into them for the benefit of the sick, and will abstain from every voluntary act of mischief and corruption; and, further, from the seduction of females or males, of freemen and slaves. Whatever, in connection with my professional practice or not in connection with it, I see or hear, in the life of men, which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret. While I continue to keep this Oath unviolated, may it be granted to me to enjoy life and the practice of the Art, respected by all men, in all times! But should I trespass and violate this Oath, may the reverse be my lot!"

The older we grow, the more we realize the meaning of such ideals. A glance backward at the pioneers, the hewers of the roads that have made easier our footsteps in the difficult path of progress, harms us not, nay helps us greatly. After all, Hippocrates died only a few years ago. Counting father and son, three generations to a century, seventy-four men would stand for you and your father and his father back to Hippocrates. Not time for much change in human nature or mental power! Perhaps that is why the change has been so small.

"Wer nicht von dreitausend Jahren
Weiss sich Rechenschaft zu geben,
Bleib'im Dunkeln, unerfahren,
Mag von Tag zu Tage leben."

In preparing this paper the author has been greatly aided by the Edition of Hippocrates in the Loeb Classical Library, with introductory essays and notes by W. H. Jones; the Teubner Edition of Hippocrates; and by Adams' Translation of Hippocrates. Quotations are made from an address on Hippocrates, by Bartlett, before the graduating class of the College of Physicians, New York, in 1838. The writer has also been aided by "Greek Biology and Medicine," by Henry Osborne Taylor, from whose work the translation of the "Oath" was taken. All the translations have been compared with the original text, and some of the translations are by the writer.

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# NEW ENGLAND SURGICAL SOCIETY

## Season of 1924 at Hartford, Conn., September 26 and 27

# RADIUM TREATMENT, WITH OBSERVATIONS UPON ITS ACTION IN SELECTED CASES*

BY GEORGE C. WILKINS, M. D., F. A. C. S., MANCHESTER, N. H.

As a therapeutic agent, radium is one of the most valuable aids to surgery, and I believe it should always be considered in this relation. While not overlooking the fact that radium has been employed successfully as a therapeutic agent in many non-surgical diseases, one must associate its principal uses as being applicable to conditions primarily classified as surgical. Some former surgical procedures have been supplanted by radium treatment, in many conditions the assistance given by radiation enables the surgeon to perform operations more successfully, and in other pathological conditions, notably in advanced malignancy, radium has given a measure of relief and longer life, where surgery could offer nothing, though unfortunately, many patients in this group have, in the past, been subjected to hopeless operations through mistaken judgment, or excess of zeal.

If, then, radium should be classified as a surgical therapeutic agent, does it not seem reasonable to maintain the position that radium should be used chiefly by the surgeons. A surgeon, by the very nature of his training and daily practice, by his clinical knowledge of anatomy, pathology and the technique of operative procedures, should be able to use greater skill in the method of application and better judgment in determination of dosage, than one not so trained. Furthermore, he stands in a more authoritative postition when it is necessary to decide between the relative merits of surgery or radiation in the treatment of a given case. I have seen no reason yet to change this opinion held several years ago, when I first began to use radium as an adjunct to surgery.

### EPITHELIOMA OF THE SKIN

In the treatment of epitheliomata of the skin, radium is the treatment of choice, even when the deeper tissues have become invaded. When the deeper tissues are involved, radium needles, imbedded 1 cm. apart, beneath the area involved will cause destruction of the growth, slowly to be sure, but effectually. In less advanced cases, surface application of the radium is sufficient. It may be argued that excision with the knife has achieved successful results in the past. True, but radium can be used successfully, with practically no scarring, about the lids, canthi, and on the tougher, unyielding tissues about the nose, where it is difficult to perform excision without deformity. If it is the better agent for removal of growths in locations difficult of access, then why is it not the better agent elsewhere. Furthermore, epitheliomata of the skin treated by radium are less likely to recur than when removed by excision. The same line of argument applies to the treatment of keratoses of the skin. Of the skin epitheliomata I have treated, 10% have been for recurrence after surgical removal.

### ORAL CANCER

The next paper will cover several phases of oral cancer and I will only state my conviction that the knife has no place in the treatment of cancer within the mouth. The knife adds to the danger of recurrence, by carrying cancer cells into the tissues, and by cutting across lymphatics and blood vessels; and there is the ever present tendency to leave too much tissue behind in the attempt to achieve a good plastic result. I believe the best results can be obtaind by thorough electro-coagulation of the entire involved area first, under a local or general anaesthetic, followed immediately by the insertion of radium deeply throughout the destroyed tissues. When accurately applied, the heat generated in the tissues by electro-coagulation effectually seals the lymphatics and blood vessels immediately surrounding the area of destruction. The treatment must be thorough and wide, and the dosage heavy, disregarding subsequent bone destruction and the temporary very painful reaction lasting from two to six weeks. When a considerable area of the tongue or floor of the mouth is to be destroyed, a preliminary ligation of the lingual artery should be performed.

The following are illustrative types of oral cancer difficult or impossible to remove surgically on account of their location, but which have been successfully eradicated by employing the combination of electro-coagulation and radium.

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*Read before the meeting of the New England Surgical Society at Hartford, Conn., September 26 and 27, 1924.

Mr. CC was referred to me November 1, 1920, with a tumor 1 cm. in diameter lying on the right side of the fraenum of the tongue, and involving the mucous membrane of the floor of the mouth. A small white area was noticed at the site of the present tumor in February, 1920. In June, first noticed increase in the thickness. On November 1, two 12.5 mg. needles were buried in the tongue, and one 25 mg. tube, screened with lead and rubber, placed on the surface for cross-firing. This remained in place three hours, and then treated the next day for the same length of time. On November 22 the slough had separated and the area had nearly healed. On this date two needles and one tube, totalling 50 mg., screened with lead and rubber, were placed over the area for one and one-half hours. Also the glandular area on the outside of the neck was radiated for six hours on each side with the same dosage. In April, 1921, there was no sign of recurrence at the same place, but on the floor of the mouth, .5 cm. to the right, was a recurrence with two or three small indurations. This area was then treated with electro-coagulation, following which four needles were buried in the floor of the mouth for four hours. There is no sign of recurrence at the present time.

Mr. GF. Age, 65. For eight months had been aware of a sore in the mouth, which constantly increased in size, considerable tenderness, but no pain. On examination a gray ulcer with elevated edges, size of a 25-cent piece, involving the left soft palate, anterior pillar, and edge of the tongue. Underneath this ulcer was deep infiltration with fixation. Treatment: April 19, 1922, under ether anesthesia, electro-coagulation of the entire area, paying particular attention to the base of induration and the involvement of the tongue, following which four 12.5 mg. needles were buried 1 cm. apart, deeply, and one 25 mg. tube covered with gauze and rubber was sutured to the surface that had been cauterized. This arrangement of needles and tube furnished perfect cross-firing. The tube was removed in six hours and the needles in 12 hours. In March, 1924, practically two years after the treatment, there was no sign of recurrence. Patient died of pneumonia at this time.

Miss HH. November 25, 1922. Referred on account of growth at the junction of the upper lip in the alveolar membrane in the median line. It had increased in size in the past six months until it was impossible for her to wear her dental plate. About a month previous to my examination an attempt had been made to remove the growth. It had been cauterized and curetted. At the time of my examination there was a mass 2 cm. wide and 1 cm. thick pushing out the upper lip, and firmly fixed to the bone. Patient was given an anesthetic, and the entire area treated by electro-coagulation, following which four 12.5 mg. radium needles were buried for eight hours. For three months the patient suffered a great deal of pain, but six months later the pain had ceased. At this time there could be seen an area of devitalized bone, .5 cm. in diameter, surrounded by normal pink mucous membrane. There was no induration, and now, nearly two years later, there is no sign of recurrence. Pieces of sequestrum have been removed from time to time, and there is a small permanent opening between the sulcus beneath the lip and right nares.

Mr. TR. September 12, 1923. For seven years a gradually increasing area of leukoplakia on the inside of the right cheek, opposite the molars, and involving the sulcus between the cheek and alveolar membrane. During the past nine months this had become thickened, rough and furrowed, and finally developed granular processes on its surface. At the time of examination area involved was 4 x 2.5 cm. on the cheek, the narrowest point being at the junction of the buccal mucous membrane and the ramus of the jaw. The mucous membrane over the alveolar process of the last three teeth was also involved. Treatment: Molar teeth were removed by a dentist, following which the entire area above described was treated with electro-coagulation under procaine anesthesia, following which six radium needles were buried throughout the entire area for 10 hours. This treatment was followed by considerable pain for about two months and was accompanied by sloughing of the tissues which had been treated, together with some destruction of the alveolar process. On December 21, 1923, the cavity left after removal of the slough was radiated with 75 mg. of radium, screened with 2 mm. rubber, for two hours, and the glandular area immediately beneath the jaw was radiated over two 2-inch areas with 75 mg. of radium, screened with 2 mm. brass, 2 mm. rubber, and 2 cm. of cork. After this there was progressive healing. Sequestrum was removed from the jaw about July first, 1924. This entire area in the mouth now looks clean and healthy.

In cancer of the mouth, perhaps more than elsewhere, should one refrain from any form of treatment, particularly radiation, when the disease has obviously advanced beyond a reasonable chance of cure. It does, however, require nicety of judgment, and considerable experience to be able to decide whether or not a patient can receive real benefit from some form of treatment. My failures in oral cancer I believe have been due to my inability to accurately judge curability, but fortunately each failure has taught its lesson.

Cancer of the lip, unless involving a considerable portion of the deeper structures, can be treated as well with radium, probably more effectually, and with less deformity. The lymphatic area should receive external radiation coincidently. It is unnecessary to remove the cervical lymph nodes in every case, but when metastases are present or suspicioned, they should be removed and radium buried in the depths of the wound, or through the open wound radium emanations may be implanted in the glandular area. In only two of my lip cases have subsequent metastatic nodes developed. These were removed and a radium tube applied in the cavity for several hours. In one case, there has been no recurrence after two years, and in the other case, there have been two recurrences lower in the neck. In larger involvements of the lip, I believe the classical surgical procedure on the lip and neck should be performed, followed by thorough radiation of the entire area.

WS presented himself 1921 with cancer involving the entire lip, with metastatic nodes on either side of the neck. Preoperative radiation, followed in five days by a V incision involving the whole lip, removal of glandular area on both sides of neck, through a collar incision, and a plastic Burow operation to form new lip. After healing, the lip and neck were radiated twice. This man, three years later, has no recurrence.

### ORBIT, RECURRENT BREAST AND NECK

In 1920, I removed a protruding and pulsating mixed cell sarcoma from the orbit of a woman 70 years of age. On account of some benign tumor, the eye had been removed thirty years previously, by Dr. Maurice Richardson. Without the help of radium, and with only surgical removal of the sarcoma, one would expect recurrence. As early as possible after removal of the sarcoma, the orbit was thoroughly radiated and after a period of four years, she presents no symptoms of recurrence.

Accessible nodes recurring after breast operations respond very satisfactorily to radiation with buried needles and in my experience no recurrences have appeared in the same vicinity; which is contrary to the rule in surgical removal.

Three patients have been successfully treated with radium for recurrences after the surgical removal of cervical cancer just below the ear. These patients have all been without signs of further recurrence for two years or more.

### CANCER OF THE CERVIX

Much has been written about the treatment of cancer of the uterine cervix, operation versus radium. I think all will agree that the border line cases will show as many cures with radium as with operation. All will agree that the somewhat advanced cases will show better results with radium, while in the really advanced cases surgery can do nothing, while radium will relieve pain for a time, will stop hemorrhage, and prolong life. The only real argument, then, concerns the early cases, and the recent preliminary report of the committee appointed by the American College of Surgeons, to investigate this subject, of which committee Dr. Greenough is chairman, reveals many interesting figures. It would appear from this report that a patient with favorable cancer of the cervix has a 1 to 4 chance of cure by operation, and a 1 to 3 chance with radium. Unfortunately, however, the report shows that the patient who is treated by hysterectomy must assume a 1 to 5 chance of dying from the operation itself. This operative mortality is too high to be passed over without giving it thoughtful consideration. Also keep in mind the fact that these figures refer to the favorable cases, which are, unfortunately, few in number.

Out of thirty-nine cases, I have used radium alone on all but two, because in a little over four years I have seen only three early cases, and one of these had incipient tuberculosis. All other cases had involvement of the parametrium or vaginal walls. I cannot feel that patients coming to me differ materially from the average met with by other surgeons. Six cases have been quite advanced, with solid fixation and constant pain. This last group was treated for the purpose of stopping haemorrhage or discharge. Realizing the fact that sufficient time has not elapsed to present definite figures and percentages on the results of treatment in this series of cervix cases, I will, however, call attention to the fact that of these unselected cases, many of them advanced, fifteen of the thirty-nine are without symptoms, living their ordinary lives, and showing no recurrence of activity, covering periods of from one to four years. Ten have died of cancer, all having been advanced cases, and two fairly favorable cases have died, one from nephritis, and the other from diabetes. There is a definite field of usefulness for radium in the treatment for vaginal recurrences after hysterectomy. These recurrences are usually accompanied by much bloody discharge with odor. Thorough radiation of the vagina will reduce or remove the new growth, and cause cessation of the discharge. I have treated six cases of this type, and the treatment resulted in relief from symptoms for periods ranging from five to fourteen months. It is of interest to note that in every fatal case, that had been previously treated with radium, there never developed the foul discharge always associated with terminal cancer of the uterus. This is characteristic of radium treated cases, and it surprises one to observe the extremely small amount of discharge present, and the comparative absence of odor. When I compare these intermediate results, if I may so term them, with my results in treating cancer of the cervix before the advent of radium, I feel that definite progress has been made.

The successful treatment of cancer of the cervix is, in a great measure, due to the central location of the cervical canal in the pelvis. The radium rays reach for several centimeters in all directions, and owing to the natural resistance of the tissues of the cervix to destructive radiation, it is possible to give large doses from within the cervical canal. These patients are treated without an anaesthetic, the radium is placed in the cervical canal; or when the growth is more on one side, I bury needles in the new growth and place a tube in the canal. The radium remains twenty-four hours. After a twenty-four hour interval, another similar treatment is given. Two weeks later a third treatment is given. The complete dosage is 5400 milligram hours. There is usually, though not always, some local discomfort and cystitis for about 10 days, haemorrhage and discharge ceases, the patients feel better, usually take on weight and in three months, unless the case is advanced, no active signs are apparent, and the cervix has contracted to a small connective tissue mass.

To determine the amount of involvement in cancer of the cervix, one must always depend on the rectal examination, as this is the only method that will give a fairly correct idea. The finger in the vagina only palpates a limited area of tissue, while in the rectum the finger passes behind the growth and can palpate lateral involvements even to the pelvic walls.

### ADENO-CARCINOMA OF THE UTERUS

Adeno-carcinoma of the fundus uteri is best treated by pan-hysterectomy, followed by radiation of the pelvis. Intrauterine preoperative radiation up to 2400 milligram hours is also of undoubted value. Please picture to yourselves, however, a woman fifty-eight years old, weighing two hundred and fifty pounds, and unable to lie flat on account of asthma. I think few of you would care to accept the responsibility of advising pan-hysterectomy on such a person. I did not. I used intrauterine radiation up to 7200 milligram hours. Bloody discharge ceased in a week. The uterus contracted in size and she is without symptoms today. The treatment was one year ago, and I am not expecting cure, but hope for it. Out of seven cases of adeno-carcinoma I have treated, two have been too fat to advise operation, and two were so stout that the difficulties and dangers attendant on removing the entire uterus led me to combine operation and radium. A preoperative radiation was given, followed in five days by supravaginal hysterectomy, followed on the 18th and 20th days with radium in the cervix for 24 hours each day. Of the seven cases of this type, all are living, and all but one are well in varying periods from three months to 3½ years. One patient on whom I did a pan-hysterectomy, preceded and followed by radium, 3½ years ago, has a recurrence in the vagina.

### NON-MALIGNANT EXCESSIVE FLOWING

Of the numerous non-malignant diseases that have received more or less benefit from radium treatment, I will bring to your attention three pathological conditions which are essentially surgical in character, but in which, in properly selected cases, I believe radium should be substituted for, or should be used in conjunction with surgery to produce the best results. I refer to menorrhagia, the smaller uterine fibroids, and tubercular adenitis. Nineteen patients with excessive flowing due to hyperplastic, interstitial, or polypoid endometritis, or senile degeneration have all been cured permanently by radium treatment. This was accomplished after one short treatment except in one case. This one patient required a second treatment six months later. The treatment in each case lasted 3 to 6 hours, using only 50 mg. of radium. This dosage is usually not sufficient to disturb normal menstruation. When it does, the cessation is for only one or two periods. These patients are all anaesthetised, and before the radium is applied, the uterus is curetted, the curettings being examined later. The hyperplastic type is more prone to recur, and usually does if curetting alone is depended upon. The ages of the seventeen patients treated ranged from 15 years to 73. It should be borne in mind that radium should not be used in the uterus where there is an associated pelvic inflammation, even though the inflammation be of the chronic type, for radium will stir into activity the dormant organisms.

### FIBROMYOMA OF THE UTERUS

The benign fibromyomas of the uterus respond well to radiation, the radium being placed within the uterine cavity, usually for two twenty-four hour periods, the dosage depending upon the size of the tumor. There are certain contraindications however, that must be observed. Tumors larger than a four months' pregnancy and all pedunculated tumors should be removed surgically. As has been stated before, radium should not be used for the treatment of fibroids during the child-bearing period, as the dosage necessarily used will induce artificial menopause. Eight cases have come within the prescribed limits, and all have been cured with two treatments. A definite change is observed in six or eight weeks, and from that time on, the retrogression in size of the tumor is gradual and continuous. On two occasions, I have radiated to stop haemorrhage, and proceeded with operation after the patient's condition had improved sufficiently.

### TUBERCULAR ADENITIS

In the past ten years the surgical treatment of tubercular adenitis has undergone a very conservative change. Surgeons no longer perform mass dissections, which always leave an unsightly scar and frequently some paralysis. It is customary now to incise the broken down node, curette and allow nature to heal. Surgical removal of nodes is frequently followed by recurrence in adjacent glands. In 1921 Dr. Russell Boggs of Pittsburgh stated that 90% of the cases of tubercular adenitis could be cured with radiation. When the nodes are firm and have not become caseous, the application of radium externally in less than erythema dose will cause a gradual shrinkage of the nodes, due to an absorption of the lymphatic tissue and production of fibrous tissue. Usually, two treatments six weeks apart are sufficient to bring about the desired result, and this with a few hours hospital confinement, no operation, and no scarring. Furthermore, the cure is more certain than with surgery. I have cured a dozen tubercular glands appearing in one man after three operations had been performed. I have treated successfully with radium, 19 cases of tubercular adenitis. When the nodes have become caseous or liquefied, surgery must be employed, but I have found radium to be of the greatest value in inducing more rapid healing. The method of treatment is as follows: if time allows, the glandular enlargement is first radiated externally as above described. If the gland demands immediate opening, the external radiation is applied later. Under gas anaesthesia, a very small incision is made, a curette is introduced, and the abscess cleaned out gently. A tube of radium containing 50 or 75 mg. is placed within the cavity for about one hour and then removed. This results in quicker healing and much less discharge than occurs without the use of radium. Old tubercular sinuses heal quite rapidly if a small tube of radium is applied in the sinus, but only when the bottom of the sinus can be reached.

I truly believe that radium is the treatment of choice in tubercular adenitis, but we must remember the responsibility of checking the disease in the primary stage, and treat the glands as soon as they are discovered. It is to be remembered that large cervical glands may be due to sarcoma, Hodgkin's disease, and leukemia, and that radium therapy is still the best form of treatment for multiple glandular tumors.

### CONCLUSIONS

It will appear from a review of the selected types of cases above described, that the patient afflicted with any of these conditions will receive the utmost benefit if treated with a combination of surgery and radium. With some patients the surgical treatment may predominate, while in others, for instance, in patients with menorrhagia, surgical procedures merely serve as a means to facilitate the radium treatment. With parametrial involvement in carcinoma of the cervix, radium is to be preferred over surgery, and in tubercular adenitis, radium is the best therapeutic agent. It is possible to cure cancer in some conditions where surgery has failed, and also in some locations where the technical difficulties or surgical procedures contraindicate operation. It is also possible with radium to relieve patients of distressing symptoms during their last months, where recurrences have followed surgical procedures, and it will usually relieve the patient who has delayed too long in seeking treatment. It is desirable that all cancer patients may have available the four tried and recognized methods of treatment, surgery, electro-coagulation, X-ray, and radium.

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# CARCINOMA OF THE BUCCAL MUCOUS MEMBRANE*

BY CHANNING C. SIMMONS, M. D., BOSTON

Besides making some remarks on the surgical treatment of cancer of the mouth, I am taking this occasion to report briefly a small series of consecutive cases operated upon more than three years ago, with the end results. I have used the term cancer of the buccal mucosa rather than cancer of the cheek, tongue and jaws as the tumor must arise from the mucous membrane and the problem of treatment is essentially the same wherever situated. My experience has been at the Massachusetts General and Collis P. Huntington hospitals. At the latter institution nearly 200 cases of this disease are examined a year most of whom are in the advanced stage.

*Etiology.* Although in a few cases no etiological factor can be found, chronic irritation in some form has a very definite relation to cancer of the mouth. In a series of 189 cases of cancer of the tongue observed at the Huntington Hospital definite evidence of chronic irritation was noted in the records in 65%. It is essentially a disease of men most of whom use tobacco in some form and I have been impressed in asking specifically if the patient chewed to find how many use it in this manner. It is not uncommon to find cancer of the cheek on the side on which the quid is held. Pyorrhea and rough or carious teeth are almost universal in the class of cases seen at a general clinic, while poorly fitting plates or other form of dental apparatus are not uncommon. Cancer of the alveolar process or hard palate due apparently to a poorly fitting plate is quite often seen and usually means that the patient has not reported to a dentist to have the plate adjusted as the shape of the jaw changed. Leucoplakia is a definite precancerous condition and while it may exist for years without becoming cancerous there is always that possibility. This is an hypertrophy of the papillae and must not be confused with geographical tongue which is an atrophy. Bloodgood states that leucoplakia is never seen except in tobacco users. This may seem to be a rather broad statement but there certainly is a distinct relation between the use of tobacco and leucoplakia and the condition often improves remarkably if tobacco is prohibited.

Much has been said in regard to the relation of syphilis to cancer of the mouth. Cancer may arise in a specific leucoplakia, in old scars, or in a gumma but the lesion is quite characteristic and the cancer often multiple. Quick found the Wassermann positive in 45% of a series of cases of cancer of the tongue. Bloodgood found it positive in 20% while in a personal series of 189 cases it was positive in 14%. Cancer and specific lesions of the tongue are often present at the same time and much time may be lost by treating the patient for syphilis with improvement of the condition in the mouth as the specific condition heals, while in the meantime the cancer is increasing. Personally I always take the blood for a Wassermann examination but disregard the report and treat the lesion as cancer if it is at all suspicious.

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*Pathology.* Microscopically all are squamous cell cancer, but clinically two main types may be distinguished. The first is the typical indurated cancerous ulcer which grows rapidly and forms metastases early in the course of the disease. The second type is papillary in character, of slower growth and forms metastases relatively late. It is particularly apt to occur on the gums or cheeks. A form of cancer often overlooked is that arising from the fold of mucous membrane about a tooth. The first symptom in this type is a loose tooth and the presence of malignant disease is often not suspected, the tumor tissue being mistaken for granulation tissue. The bone is envolved early in this type of cancer and the prognosis is bad. The rapidity of growth and relative malignancy also seems to vary with the position. Cancer of the tongue and of the floor of the mouth beneath the tip of the tongue seems to be the most malignant. Cancer of the lower jaw is slightly less malignant than cancer of the tongue while cancer of the cheek is still less malignant. Cancer of the upper jaw is relatively benign. The type of growth, its position, the duration, and extent, and condition of the patient are all factors that have to be taken into consideration is making a prognosis and determining the line of treatment to be followed.

Glandular metastases occur early, often within one month from the onset of the disease, and are usually confined to the same side as the growth although cross metastases do occur. The metastases are usually regional and rarely extend below the bifurcation of the carotid except in the later stages of the disease. Solitary metastases in the supraclavicular, axillary, or mediastinal lymph nodes do occasionally occur. In this respect cancer of the tongue differs radically from cancer of the breast.

Multiple cancer, that is, several distinct foci of disease, is not uncommon and is associated chiefly with leucoplakia and syphilis. What may be termed reoccurrence in distinction to recurrence following surgical excision is also seen. By re-occurrence is meant a second cancer arising in the mouth but apparently having no relation to the one previously removed. Three cases in this series of 53 had a re-occurrence and are classed as "dead of disease." In one a small cancer of the tongue at the foot of the anterior pillars of the fauces was removed three years ago. Two and one half years later a second cancer was removed from a similar position on the other side. The patient died six months later of cancer of the lower end of the oesophagus. Cancer of the base of the tongue at the foot of the anterior pillars of the fauces is often difficult to differentiate from inflammation of the large papillae situated in this region.

*Symptoms.* There are no subjective symptoms caused by cancer in the mouth in its early stage. This fact should be impressed on the laity, dentists, and physicians as the growth in this stage can be entirely removed by a minor operation. I feel that the dentist can do more to lower the death rate from this disease than the physician as he is usually consulted first and should recognise any suspicious lesion and refer the patient at once to a surgeon. In Bloodgood's series of 160 cases of cancer of the tongue in 87 the disease was not recognised by the first man consulted, and of these 87, 33 were dentists and 54 physicians. In the series from the Huntington Hospital, 189 cases, 74 were known to have received poor advice from the first man consulted. The subjective symptoms appear as the disease progresses and are due to interference with function, pressure on nerves, or are the result of secondary infection. Objectively cancer of the mouth in the early stage is a superficial ulcer with a more or less indurated edge and base, or a papillary growth. If it is treated radically at this time it can in most instances be cured. I feel strongly that our statistics relative to the cure of cancer in all situations will be improved more by early recognition that by any change in the form of treatment.

*Diagnosis.* I have spoken of the relation of syphilis to cancer of the mouth. One other condition often difficult to distingush from cancer is tuberculosis. Tubercular ulcers are, however, almost always painful and are associated with tuberculosis elsewhere in the respiratory tract. In some respects simple ulcer is the most difficult condition to differentiate from cancer and I believe that any ulcer that does not heal in two weeks after all sources of chronic irritation have been removed should be treated as cancer, excised and examined microscopically. Other conditions that might be confounded with cancer are actinomycosis or foreign body in the tongue, some form of odontoma of the jaw, sarcoid, cysts, etc. A fibrous hypertrophy of the tissues over the gums is at times seen which might be mistaken for cancer but it has not the rocky hardness of malignant disease. This is caused by the irritation of a poorly fitting plate.

*Operability.* Assuming that surgery is the treatment of choice, the operability of cases seen in a general clinic is comparatively low. Judd reporting from the Mayo clinic estimates it as 40%, Farr at the New York Hospital as 50%. In a series of 57 consecutive cases admitted to the wards of the Massachusetts General Hospital it was 65% but it must be remembered that many cases were recognised as inoperable in the Out-Patient Department and not referred to the wards. I feel that the operability is probably in the neighborhood of 50% when the case is first seen by a surgeon. Personally I do not consider any case suitable for an attempt at cure by a radical surgical operation if palpable glands, obviously cancerous, can be felt in the neck. These cases can be benefitted, however, in many instances by a local palliative operation.

*Treatment.* The problem of prophylaxis should first be considered. If the mouth was kept clean and all sources of irritation removed cancer in this region would not be as common. When cancer is recognised in the early stage before metastases have occurred anything that will destroy the growth will cure the patient. Later the possibility of metastases has to be considered. We must remember that the object of any treatment in cancer is to remove all the disease and the immediate cosmetic result should not be considered when we are trying to save life. The local growth can be removed surgically, or destroyed by cautery, radium, fulguration, or other form of electro-coagulation. Personally I advise surgery in every case when possible. It is more rapid, infinitely less painful than radium, allows a pathological examination to be made, and is more sure. I know that certain others believe differently but I have yet to be convinced that surgery is not the best treatment. In advanced cases radium and x-rays make the patient more comfortable and prolong life for an appreciable time.

If the growth is small and the diagnosis doubtful it is usually best to remove the entire tumor rather than a small portion for microscopic examination. The operation is but slightly more difficult and the disability and deformity no greater. If the disease then proves to be cancer a further local operation is not necessary.

All patients receive morphine one and one half hours and a second dose with atropine one half hour before operation, the dosage depending on the type of patient. Ether is used as an anesthetic, given by the intrapharyngeal method, and the pharynx packed off with gauze. The patient is placed on the table with the head and shoulders slightly elevated. If the growth is operable but a general anesthetic contraindicated an extensive operation can be done on the tongue or cheek under novocaine anesthesia. In certain cases preliminary ligation of the external carotid or lingual artery may be done which makes the field more bloodless and tends to diminish the possibility of secondary haemorrhage.

It is astonishing how little permanent disability and deformity follows any of these operations. At least one half of the tongue may be removed with but little interference with deglutition and phonation. Excision of the upper jaw, if a prosthetic apparatus is fitted before scar contraction occurs, is followed by little deformity. Following excision of the lower jaw the deformity is greater but may be much reduced by a proper fitting plate.

Postoperative x-ray treatment to the glands of the neck is advised in all cases.

For convenience in considering treatment the cases have been divided into groups.

1. *Precancerous lesions.* Excision of the tumor through the mouth under local or general anesthesia, with closure of the wound with fine black silk sutures. I feel that silk is preferable to cat gut as it is more dependable, and is easily seen and removed.

2. *Very early cancer.* Intrabuccal excision followed by cauterization of the raw areas. For this I use a plumber's cautery,—a jeweller's solder iron. This is preferable to the electro-cautery as it retains the heat in the presence of blood and saliva and is hot enough to destroy the tissues for some distance beyond the cut surface. A foul wound results but the slough separates in from 8 to 10 days and healing by granulation is then rapid. There is often a secondary haemorrhage at the time of the separation of the slough which, while at times alarming, has never proved serious. Ligation of the external carotid or lingual artery may be done for this if necessary. I do not hesitate to split the cheek if the growth is not easily accessible, closing the wound later by interrupted silk sutures. The operation even if extensive is usually followed by comparatively little pain and the patient is up and about in a few days. In the very early cases dissection of the glands of the neck is not necessary.

3. *Cancer with few or no palpable glands in the neck.* Intrabuccal excision of the growth with cauterization followed in ten days by a radical dissection of the glands of the neck on the side on which the growth was situated. By radical dissection is meant removing the internal jugular vein, the sterno-mastoid muscle and all the glands from below the omohyoid muscle to the base of the skull including the contents of the submaxillary triangle. Care should be taken to remove all the glands below the mastoid process and the tonsillar gland. The only structures which have to be regarded are the carotid artery and pneumogastric nerve, and these once identified are easily avoided. It is well, if possible, to leave a small portion of the upper part of the sterno-mastoid muscle to avoid injury to the spinal accessory nerve. The most difficult step in the operation is the ligation of the upper end of the internal jugular vein at the base of the skull and if it is wounded at this point there may be an annoying haemorrhage. I believe that a less radical dissection is more apt to deseminate the disease than remove it and that it is as necessary to remove the sterno-mastoid muscle in performing a neck dissection for malignant glands as it is to remove the pectoral muscle in the dissection of the axilla in cases of cancer of the breast. The wound is closed with a drain in the lower portion. There is comparatively little shock and the patient is usually up in four or five days and discharged on the tenth

day. There is, however, considerable difficulty with deglutition for several days, due probably to the interference with the nerve supply of the pharyngeal muscles. If the radical operation is done as described the operative mortality is low. Theoretically the dissection of the neck should be done first but practically it is advisable to remove the tumor first, for if any post-operative complication should follow the neck dissection it would be necessary to postpone the removal of the primary focus in the mouth for some time and if the growth was rapid it might become inoperable. I am not in the habit of planting seeds of radium emanation in the wound in the neck after removal of the glands as, if the operation is radical, there is nowhere to place them except in close proximity to the carotid artery or pneumogastric nerve. Seeds may be planted in the wound in the tongue in certain cases after excision and cauterization of the growth.

In many cases on account of the age or general condition of the patient it is not advisable to perform this two-stage operation. In these cases the local growth is removed as described, and the glandular areas in the neck treated with x-ray. If the growth is situated in the midline it may be necessary to dissect both sides of the neck and if this is done the operations should be performed about two weeks apart.

4. *Cancer with definite glandular metastases,* but in which local excision of the primary growth is possible. Intrabuccal excision of the growth with x-ray treatment of the glands of the neck. This operation is palliative but if the local growth can be removed the relief is greater than when it is treated by other methods and life may be considerably prolonged.

5. *Inoperable cancer.* Radium treatment of the local condition and x-ray exposures over the glands of the neck. The radium is employed as "seeds" each containing 1 millicurie of emanation, from 5 to 12 seeds being inserted the number depending on the size of the growth. From each seed of 1 millicurie so introduced the patient receives 132 millicurie hours treatment of unscreened radium. It is usually better to give one heavy treatment and to keep the patient under observation than to give small weekly treatments. The heavy treatment can be repeated in from 6 to 10 weeks as necessary, but the first treatment is of more value than subsequent ones. The treatment is painful, but the pain is probably not much greater than that caused by the growth and life may be considerably prolonged.

6. *Post-operative recurrence.* Radium seed treatment to the local recurrence and x-ray exposures to the glands of the neck.

The following two tables give the end results of 53 consecutive cases operated upon more than three years ago. As the numbers are small the tables are very much condensed for the sake of clearness. In certain of the cases in the early part of the series which at the present time I should consider hopeless, an attempt at radical cure was made, while in certain others the operation was done purely as a palliative measure although an occasional unexpected cure was obtained.

The more the cases are studied the more difficult it is to tabulate the results in a manner which will give a true impression. It is obvious that the results of any method of treatment on early cases will be better than on late cases and on the papillary type better than on rapidly growing, infiltrating cancer.

## RESULTS OF OPERATIONS

### CANCER OF THE BUCCAL MUCOSA—THREE YEARS, 1918-1920

*Tongue*—26 Cases

| | | |
|---|---|---|
| Died of disease | 19 | |
| Living with disease | 2 | |
| Died without disease | 2 | |
| Living without disease | 3 | 12.5% cures |

*Lower Jaw*—8 Cases

| | | |
|---|---|---|
| Postoperative death | 1 | |
| Died of disease | 5 | |
| Living without disease | 2 | 25% cures |

*Cheek*—13 Cases

| | | |
|---|---|---|
| Died of disease | 6 | |
| Living without disease | 7 | 52% cures |

*Upper Jaw*—5 Cases

| | | |
|---|---|---|
| Died of disease | 2 | |
| Died other cause over 3 years | 1 | |
| Living without disease | 2 | 60% cures |

*Tonsil*—1 Case

Died 2½ years after operation of strangulated hernia. No recurrence.

### TOTALS

*Total* 53 Cases

| | | |
|---|---|---|
| Postoperative death | 1 | |
| Died of disease | 32 | |
| Living with disease | 2 | |
| Died less than 3 years without disease | 3 | |
| Died over 3 years without disease | 1 | |
| Living 3 or more years without disease | 14 | 30% cures |

Three cases, 1 dead and 2 living with disease, are cases of reoccurrence.

| | | | | |
|---|---|---|---|---|
| Radical operations | 19 | Well | 6 | 31.5% |
| "Palliative" operations | 29 | Well | 9 | 31% |

| | |
|---|---|
| Operability, Massachusetts General Hospital (57 cases) | 65% |
| Operability, Judd from the Mayo Clinic | 40% |

## DISCUSSION OF DR. WILKINS' AND DR. SIMMONS' ARTICLES

**Dr. Arthur T. Jones**, Providence: I feel that radium and x-ray should be a part of the armamentarium of the surgeon, and I wish to go on record as opposing decidedly the use of radium in the hands of the inexperienced essentially laboratory man. There are some cities in which radium is being used by men who are not experienced practitioners and diagnosticians. Cases are coming to them direct for treatment, and the laboratory man is making his diagnosis and treating his cases. I think that is a condition that should not exist, and that these cases should be under the watchful eye of the surgeon.

In speaking of carcinoma of the uterus I think we are all agreed that those cases should be treated today with radium and not by operation—I am speaking of carcinoma of the cervix. Last week I was in Cleveland, and in talking with Dr. Crile who is doing a great deal of this work at the Crile Clinic he said his position was stll unchanged from that of a year ago. He then made the statement that they were treating none of their cases of cancer of the cervix by operation but had given them all over to radium treatment, but he was not quite ready to give over cancer of the body of the uterus to radium treatment. He said he might change his mind later, but he said that cancer of the body of the uterus is still an operable condition. Their cases of cancer of the cervix are treated by radium followed by x-ray, and then they are operated and a hysterectomy done. That isn't so all over the country, but the statistics which they are collecting of their work in that way, I think, will be of immense value to us because it is only by operative work following radiation that we can tell whether we have completely killed the cancer cells or whether there are cells still remaining in the radiated tissue.

**Dr. H. L. Smith**, Nashua: The field of the knife in the treatment of malignant disease is certainly being restricted, and we may even be approaching the day when its use will be considered malpractice. In cancer of the superficial parts we have well nigh reached that point already. Here radium will do all that the knife can do, while it reaches farther and leaves less scar.

In the oral cavity excision alone, without radiation in some form, gives little hope of permanent cure and should, I believe, be discountenanced. In the vagina the results are much the same. I have recently seen cases of beginning cancer of the cervix in which the local growth was so slight that a bit of tissue was taken for examination rather as a matter of routine than with the expectation of finding malignancy, but which, on immediate abdominal section, were found to be quite inoperable owing to general metastases. In such cases one cannot help questioning whether the slight trauma incident to taking a section for diagnosis may not be sufficient to set free cancer cells into the lymph streams. Perhaps we shall come to believe that the only safe rule is to radiate first and confirm the diagnosis later.

Of one thing we may feel quite sure; operative technique has very nearly reached its limit of refinement. But no one today can foresee the ultimate strength of radiation or our future ability to direct and control it.

**Dr. Lincoln Davis**, Boston: I have not anything to say about carcinoma of the buccal cavity, but there seems to be considerable discussion about carcinoma of the cervix. I am sure I hope that something better than the knife will be developed for the cure of carcinoma everywhere in the body, but I do not feel sure that it has been developed yet for carcinoma of the cervix. We are all influenced by our own results, and my own cases which have had radium have been disappointing as far as cure is concerned.

Now this is the proposition I would like to put up to the Society: If you have a case of carcinoma of the cervix, in which the disease is still confined to the cervix,—and we all agree that there must be a stage of the disease when it is confined to the cervix—granting that is the condition of the case, isn't that patient given a better chance of cure by a clean, complete removal of the uterus by the knife than by treatment with radium? I am convinced of this and am waiting for proof to the contrary.

**Dr. George C. Wilkins**, Manchester (closing): In answer to Dr. Davis's question, first: in the cancer described by him, if it is possible to cure cancer in more advanced cases, why isn't it possible to cure the early cases, such as described by him, with radium without the manipulation of the tissues and without the operative danger of a complete hysterectomy? I believe the chances of cure would be equally good either way.

Yesterday there was a decided difference of opinion between my ideas of treatment in oral cancer and those of Dr. Simmons. He mentioned that the treatment at the Memorial Hospital in New York was different from the treatment in the Huntington Hospital. I wish to say that my convictions in regard to oral cancer have been very much influenced by my association with the men at the Memorial Hospital in New York. Cancer is a disease which is not regulated by rule, and the treatment will be more or less decided by the experience, the convictions and the equipment of the surgeon who is treating the case.

## BIRTH CONTROL IN CALIFORNIA

California and Western Medicine claims that birth control is in effect in California because 105,900 of the 846,700 married women in that state are childless.

# ORIGINAL ARTICLES

## THE TREATMENT OF BOTULISM

BY DWIGHT L. SISCO. M. D., BOSTON

The extremely high mortality of human botulism indicates the inadequacy of the methods of treatment. Usually a diagnosis cannot be made until seemingly irreparable damage has been done. We are further handicapped by lack of conclusive data concerning the absorption, action, pathogenicity and elimination of the toxin of Clostridium botulinum. There is evidence indicating that the toxin may be absorbed through abrasions of the skin and alveolar mucous membranes[1], but chiefly from the stomach and upper intestinal tract[2]. For many years it was thought that the central nervous system was the seat of action of botulinus toxin but it has recently been clearly demonstrated that in laboratory animals the action of the toxin is peripheral and located in the motor end plates or myoneural junctions[3] [4] [5]. There is no organic destruction of tissue and the nature of the damage is not known. Strubel[6] and Edmunds and Long[3] have shown that the action of the toxin resembles curare in that it paralyzes the nerve terminations without causing destruction of muscle contractility or nerve conductivity. Edmunds and Keiper[7] state the present conception of the action of the toxin as follows: "All the essential symptoms of botulism can be explained by an incomplete curare-like paralysis of the endings of the motor nerves to the voluntary muscles, including the diaphragm and by a more or less complete paralysis of the parasympathetic nerve endings. The paralysis of the parasympathetics is preceded by a stage of stimulation." Very little is known about the destruction or elimination of the toxin. In chickens it is eliminated in the feces but this has not been demonstrated in other animals. The frog is the only animal in which the toxin has been demonstrated in the urine.

The similarity of botulinus toxin to diphtheria and tetanus toxin led to the production of antitoxin in horses and goats and this, judged by its action in laboratory animals, is our most potent therapeutic agent. There are at least two types of Clostridium botulinum, designated A and B, and antitoxin has been prepared from each of these. Bengston[4] reports the existence of a Type C strain, but so far it has not been shown to be pathogenic to man. Botulinus antitoxins have been standardized at the Hygienic Laboratory in Washington in such way that one-tenth of one unit of antitoxin is that amount of antitoxin which, when mixed with the standard test dose of toxin and injected into a 250-gram guinea pig, will prevent the death of the pig for 96 hours. Polyvalent serum is available but is very difficult to produce, even when the horse receives equal doses of equally potent type A and B toxin, for the antibodies of one type always predominate[9].

One of the greatest obstacles to successful treatment of botulism is the limited distribution of antitoxin. The scarcity and sporadic nature of outbreaks of botulism render the commercial preparation of antitoxin unprofitable and it can now be obtained only at institutions where studies of botulism are being made.*

Botulinus antitoxin protects laboratory animals against the toxin of homologous strain provided it is injected before symptoms of intoxication develop, or, under the special conditions discussed below, even after severe intoxication has occurred. Its action in human cases, however, has been very disappointing, presumably due to the fact that it has always been administered so late in the course of the intoxication that irreparable damage has been done.

Botulinus toxin is formed in the food before ingestion occurs and, from a practical viewpoint, is not elaborated after the contaminated food enters the body. Actually, however, it has been shown that toxin may be formed in the body after ingestion of washed spores, but the number of spores necessary to produce a dangerous amount of toxin is so enormous that the fact seems of no practical importance[10] [11]. Because the full dose of toxin enters the body at one time Dickson[12] recommends the intravenous administration of antitoxin in a single large dose, 20,000 units, rather than in repeated smaller doses. At present there is no accepted procedure for repeating injections of antitoxin but if such appear necessary administration must depend upon the condition of the patient. An antitoxin which contains 200 units per c.c. is considered satisfactory[13] and the number is always indicated on the label of the container. In England the Ministry of Health recommends giving 20 to 50 c.c. of antitoxin intravenously (number of units per c.c. not stated) to patients with symptoms of botulism and repeat daily if necessary. For persons exposed but free from symptoms they recommend 10 c.c. of serum intramuscularly as a prophylactic dose followed by larger intravenous doses if symptoms develop. If symptoms are present, large intravenous doses of antitoxin are immediately indicated and in the absence of symptoms, similar prophylactic doses are probably not inadvisable. If a potent polyvalent serum is available it should be used, otherwise equal amounts of type A and B sera should be administered. The type A strain has been the cause of the great majority of the outbreaks in the United States[7] [13]. Before the administration of antitoxin the susceptibility of each patient to horse serum should be determined and desensitization accomplished if necessary.

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*These are: Hygienic Laboratory, Washington, D. C.; Laboratory of the Department of Health, New York City; New York State Department of Health, Albany, N. Y.; Department of Animal Husbandry, University of Illinois and at the University of California.

The sooner antitoxin is administered after the ingestion of toxin the greater is the chance of preventing intoxication. As far as revealed in the literature, it may be said that no human case of botulism has recovered to whom antitoxin was administered after the onset of objective symptoms. It is known that symptoms may develop within 4 hours after ingestion of toxin[14]. In outbreaks of botulism the symptoms usually appear in the persons exposed at varying intervals following the ingestion of the toxin and therefore full doses of antitoxin should be immediately given to every possible victim, even though symptoms have not yet appeared for in such prophylactic use lies its greatest value. Chickens which eat the discarded scraps of botulinus infected food may develop "limber-neck" or even die before symptoms appear in persons who have eaten the same food. Therefore, Dickson[12] suggests the development of "limber-neck" in chickens as another means of justifying the prophylactic administration of antitoxin.

It has been shown in laboratory animals that prolonged etherization or narcotization with morphin greatly retards the rate of intoxication. Bronfenbrenner and Weiss[15] show that "anaesthesia (ether) delays the progress of intoxication not only when administered immediately after the intake of toxin, but when administered much later after the intoxication has already progressed far enough to cause definite objective signs of poisoning. At this late stage of intoxication the unsupported serum therapy of botulism in guinea pigs usually remains without effect. If, however, the animals are etherized at this time and kept under the influence of ether for some time, antitoxin therapy becomes effective. Indeed, the antitoxin treatment can be delayed further for several hours, provided the animal is kept under anaesthesia during the interval." Similar results were obtained when morphin was used instead of ether.[16] No results of the application of these observations to human cases of botulism have yet been reported but the suggestions are practical and hopeful. If a person under the influence of morphin or ether is not susceptible to the action of botulinus toxin and if antitoxin administered during this period destroys the toxicity of the toxin, then the scope of antitoxin therapy is greatly increased. At present, antitoxin is almost useless because it cannot be obtained and administered soon enough to prevent intoxication. Consequently, if the interval between ingestion of toxin and administration of antitoxin can be bridged by morphin or ether, the mortality of botulism should be greatly reduced.

Edmunds, Long and Keiper[3 7] emphasize the fact that most of the muscular disturbances of botulism are due to fatigue, apparently the result of paralysis of the myoneural junctions. They note that animals always die of respiratory failure, never of cardiac failure and state that artificial respiration will maintain life in dogs for 4 days after cessation of normal respiration. Their work suggests that death is due to fatigue, rather than destruction, of the respiratory mechanism and that if patients could be tided over this period of fatigue by artificial respiration (using a tracheal cannula and bellows, if necessary) and elimination, destruction or neutralization of the toxin simultaneously brought about, death would not result. Although they have not succeeded in saving botulism dogs their failures seem to have been due to laboratory and mechanical faults. One dog died due to a plug of mucus in the cannula and another died two hours after he had apparently been "cured," presumably from too much morphin, although this could not be proved. Until there are more data indicating the influence of antitoxin in such late stages of the intoxication and conclusive evidence tending to show that irreparable damage has not been done, the success of such procedure is wholly conjectural, but nevertheless worthy of extended trial if the occasion demands. The necessary tracheotomy and possible resultant pneumonia are relatively minor factors when compared with the inevitable result of severe botulism.

A botulism patient, after the administration of antitoxin, should be handled in much the same manner as a patient with tetanus. He should be placed in a quiet, darkened room where every effort is made to shield him from all stimuli likely to cause movement of any kind. Everything should be done for him and he should be allowed no more movement than a patient in cardiac decompensation. These things are necessary because there is evidence suggesting that it is fatigue of the respiratory mechanism rather than paralysis, which causes death[3 4 12]. The mucus which collects in the paralyzed throat is the greatest source of discomfort to the patient and should be removed with soft swabs or a gentle suction apparatus. The use of pilocarpine to reduce this secretion has been suggested but it should be used only with great care and in the late stages of the intoxication is not necessary because there is then marked dessication of the tissues. A thin, oily spray may relieve the sensation of dryness in the throat. The bladder and rectum should be periodically emptied. Great care should be taken not to give too much morphin. If artificial respiration is utilized the air should be warmed before it enters the trachea. The patient's eyes should be kept moist with boric acid compresses in order to prevent infection and opacities. The food should consist of simple, soft, nourishing foodstuffs which can be easily swallowed and when this is impossible liquid foods or perhaps tube feeding will have to be resorted to. The fluid intake should be at least two liters a day and rectal or subpectoral injections should be used if necessary.

Bronfenbrenner and Schlesinger[2] [17] have shown that the potency of botulinus toxin is actually increased in the presence of acid equivalent to that of the stomach (ph 4.0) and that it is not destroyed by trypsin or pepsin. They found also that alkali greatly weakens the toxin and when its concentration is equivalent to ph 10.1 the toxin is inert. Van Ermengem found that a 3.0 per cent solution of sodium carbonate neutralized an equal volume of a toxin-water mixture[13]. These results suggest the therapeutic use of sodium carbonate in botulism but the acid-base mechanism of the body is such that the blood cannot reach an alkalinity equivalent to ph 10.1, the degree necessary to neutralize the toxin. At best, the urine can be kept alkaline and the carbon dioxide combining power of the blood high by administering sodium bicarbonate, in the hope that the action of the toxin may be retarded. Gastric lavage with sodium bicarbonate, on the other hand, may be of real value, especially immediately following the ingestion of toxin and as a prophylactic measure in victims of outbreaks who have not yet developed symptoms.

Lavage of the stomach is always indicated unless the intoxication has progressed to a point incompatible with the exertion demanded, in which case termination is probably inevitable. In patients showing great muscular weakness, care should be taken to avoid causing strangling which might result in insufflation pneumonia or death. Emetics, such as apomorphin are contra-indicated for the same reasons. Gastric lavage is especially indicated in victims of outbreaks in whom symptoms have not yet developed. Because constipation is usually so stubborn in botulism it is well to leave full doses of magnesium sulphate or castor oil in the stomach after lavage. Even when diarrhoea is present, soapsuds enemata should be frequently given, provided the fatigue caused by them is not too great.

Armstrong[18] reports an instance where ingestion of alcohol before and simultaneously with ingestion of botulinus toxin apparently prevented the development of symptoms of intoxication. It is known that, in vitro, alcohol kills the toxin and there is also evidence that the toxin is absorbed from the stomach and duodenum, where the acidity is more favorable to it than the alkalinity of the lower intestine[2]. Obviously, alcohol can have no detoxicating action after absorption has occurred but there is some reason to believe that alcohol, when mixed with toxin in the stomach, might have a neutralizing action. However, an outbreak has also been reported in which the toxin was found in "home-brew" which contained 15 per cent of alcohol[19]. The power of many other substances to neutralize botulinus toxin has been studied with the aid of animals but the results have been essentially negative[13].

Strychnine, caffeine, digitalis, atropine, pilocarpine and other drugs have been mentioned as helpful in the treatment of botulism but there is only suggestive physiological evidence that any of them would be of value. Owing to the curare-like action of the toxin, physostigmin has been suggested but animal experiments have failed to demonstrate its value[3] [7].

Geiger[7] states that there have been 134 outbreaks of botulism in the United States, involving 458 people of whom 309 or 67 per cent died. Many cases recover spontaneously without any treatment and cases showing definite symptoms have been reported as recovering. As suggested by Rosenau[20] the prognosis depends upon the amount of toxin ingested and perhaps to a certain extent upon what is in the stomach at the time, such as alcohol or some other detoxicating or absorption-delaying substance. There is also a direct relationship between the period of incubation and the amount and virulence of the toxin. In the cases which do recover convalescence is extremely slow and weakness may persist for months. Patience, nourishing food, massage, graded exercises and prevention of over-exertion are factors important to complete recovery.

The somewhat heroic measures suggested here are justified by the fact that the treatment of human botulism after symptoms have developed has been so disappointing that it has come to be regarded as hopeless. With the aid of animals, methods have recently been discovered which may prove salutary in human cases. Morphin or ether may so bridge the interval between ingestion of toxin and administration of antitoxin that the latter may prove much more efficacious than it has in the past. It seems even possible that the judicious use of morphin, ether, artificial respiration, oxygen inhalation and antitoxin might reclaim cases which are now considered past help.

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# NOTES ON BASAL METABOLISM VI: COMPLEMENTARY TABLES OF VALUES OF DREYER'S FORMULAS

BY WILLIAM H. STONER, A. M., M. D., PHILADELPHIA, PA.

[From the Biochemistry Laboratories and the Departments of Metabolic Diseases of the Philadelphia General Hospital and of the Graduate School of Medicine of the University of Pennsylvania.]

TABLE I

Expected Calories in Twenty-four Hours

Males 25 Kg. to 49.5 Kg.; 5 years to 15 years. (Females, subtract 10 per cent.)

| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25.0 | 1257 | 1226 | 1202 | 1181 | 1162 | 1146 | 1131 | 1118 | 1107 | 1096 | 1086 |
| 25.5 | 1269 | 1239 | 1214 | 1192 | 1173 | 1157 | 1143 | 1130 | 1118 | 1107 | 1096 |
| 26.0 | 1282 | 1251 | 1226 | 1204 | 1185 | 1169 | 1154 | 1141 | 1128 | 1118 | 1107 |
| 26.5 | 1294 | 1263 | 1237 | 1215 | 1196 | 1180 | 1165 | 1151 | 1139 | 1129 | 1118 |
| 27.0 | 1306 | 1275 | 1249 | 1227 | 1208 | 1191 | 1176 | 1162 | 1150 | 1140 | 1129 |
| 27.5 | 1318 | 1286 | 1260 | 1238 | 1219 | 1202 | 1187 | 1173 | 1161 | 1150 | 1139 |
| 28.0 | 1330 | 1298 | 1272 | 1250 | 1230 | 1213 | 1197 | 1184 | 1171 | 1160 | 1149 |
| 28.5 | 1342 | 1309 | 1283 | 1261 | 1241 | 1224 | 1208 | 1194 | 1182 | 1170 | 1159 |
| 29.0 | 1354 | 1321 | 1294 | 1272 | 1252 | 1234 | 1219 | 1205 | 1192 | 1180 | 1169 |
| 29.5 | 1365 | 1332 | 1305 | 1282 | 1262 | 1245 | 1229 | 1215 | 1202 | 1190 | 1179 |
| 30.0 | 1377 | 1343 | 1316 | 1293 | 1273 | 1255 | 1239 | 1225 | 1212 | 1200 | 1189 |
| 30.5 | 1388 | 1355 | 1327 | 1304 | 1284 | 1266 | 1250 | 1235 | 1222 | 1210 | 1199 |
| 31.0 | 1400 | 1366 | 1338 | 1315 | 1294 | 1276 | 1260 | 1245 | 1232 | 1220 | 1209 |
| 31.5 | 1411 | 1377 | 1349 | 1325 | 1304 | 1286 | 1270 | 1255 | 1242 | 1230 | 1219 |
| 32.0 | 1422 | 1388 | 1360 | 1336 | 1315 | 1297 | 1280 | 1265 | 1252 | 1240 | 1228 |
| 32.5 | 1433 | 1398 | 1370 | 1346 | 1325 | 1307 | 1290 | 1275 | 1262 | 1249 | 1238 |
| 33.0 | 1444 | 1409 | 1381 | 1357 | 1335 | 1317 | 1300 | 1285 | 1271 | 1259 | 1247 |
| 33.5 | 1455 | 1420 | 1391 | 1367 | 1345 | 1327 | 1310 | 1295 | 1281 | 1268 | 1257 |
| 34.0 | 1466 | 1430 | 1401 | 1377 | 1355 | 1336 | 1320 | 1304 | 1290 | 1278 | 1266 |
| 34.5 | 1476 | 1440 | 1411 | 1387 | 1365 | 1346 | 1329 | 1313 | 1299 | 1287 | 1275 |
| 35.0 | 1487 | 1451 | 1422 | 1397 | 1375 | 1356 | 1339 | 1323 | 1309 | 1296 | 1285 |
| 35.5 | 1498 | 1461 | 1432 | 1407 | 1385 | 1366 | 1348 | 1333 | 1319 | 1306 | 1294 |
| 36.0 | 1508 | 1472 | 1442 | 1417 | 1395 | 1375 | 1358 | 1342 | 1328 | 1315 | 1303 |
| 36.5 | 1519 | 1482 | 1452 | 1426 | 1404 | 1385 | 1367 | 1351 | 1337 | 1324 | 1312 |
| 37.0 | 1529 | 1492 | 1462 | 1436 | 1414 | 1394 | 1377 | 1361 | 1346 | 1333 | 1321 |
| 37.5 | 1539 | 1502 | 1472 | 1446 | 1423 | 1404 | 1386 | 1370 | 1355 | 1342 | 1330 |
| 38.0 | 1550 | 1512 | 1482 | 1456 | 1433 | 1413 | 1395 | 1379 | 1364 | 1351 | 1339 |
| 38.5 | 1560 | 1522 | 1491 | 1465 | 1442 | 1422 | 1404 | 1389 | 1373 | 1360 | 1347 |
| 39.0 | 1570 | 1532 | 1501 | 1475 | 1452 | 1431 | 1413 | 1398 | 1382 | 1369 | 1356 |
| 39.5 | 1580 | 1542 | 1511 | 1484 | 1461 | 1440 | 1422 | 1407 | 1391 | 1377 | 1365 |
| 40.0 | 1590 | 1551 | 1520 | 1493 | 1470 | 1450 | 1431 | 1415 | 1400 | 1386 | 1373 |
| 40.5 | 1600 | 1561 | 1530 | 1503 | 1479 | 1459 | 1440 | 1424 | 1408 | 1395 | 1382 |
| 41.0 | 1610 | 1571 | 1539 | 1512 | 1488 | 1468 | 1449 | 1432 | 1417 | 1403 | 1390 |
| 41.5 | 1619 | 1580 | 1548 | 1521 | 1497 | 1476 | 1458 | 1441 | 1426 | 1412 | 1399 |
| 42.0 | 1629 | 1590 | 1558 | 1530 | 1506 | 1485 | 1467 | 1450 | 1434 | 1420 | 1407 |
| 42.5 | 1639 | 1599 | 1567 | 1539 | 1515 | 1494 | 1475 | 1458 | 1443 | 1429 | 1416 |
| 43.0 | 1648 | 1608 | 1576 | 1548 | 1524 | 1503 | 1484 | 1467 | 1451 | 1437 | 1424 |
| 43.5 | 1657 | 1617 | 1585 | 1557 | 1533 | 1512 | 1493 | 1475 | 1460 | 1445 | 1432 |
| 44.0 | 1667 | 1627 | 1594 | 1566 | 1542 | 1520 | 1501 | 1484 | 1468 | 1454 | 1440 |
| 44.5 | 1677 | 1636 | 1603 | 1575 | 1551 | 1529 | 1510 | 1492 | 1476 | 1462 | 1448 |
| 45.0 | 1687 | 1646 | 1612 | 1584 | 1559 | 1537 | 1518 | 1501 | 1485 | 1470 | 1457 |
| 45.5 | 1696 | 1655 | 1621 | 1593 | 1568 | 1546 | 1526 | 1509 | 1493 | 1478 | 1465 |
| 46.0 | 1705 | 1664 | 1630 | 1601 | 1576 | 1554 | 1535 | 1517 | 1501 | 1486 | 1473 |
| 46.5 | 1714 | 1673 | 1639 | 1610 | 1585 | 1563 | 1543 | 1525 | 1509 | 1494 | 1481 |
| 47.0 | 1723 | 1682 | 1648 | 1619 | 1594 | 1571 | 1551 | 1534 | 1517 | 1502 | 1489 |
| 47.5 | 1733 | 1691 | 1657 | 1628 | 1602 | 1580 | 1560 | 1542 | 1525 | 1510 | 1496 |
| 48.0 | 1742 | 1699 | 1665 | 1636 | 1610 | 1588 | 1568 | 1550 | 1533 | 1518 | 1504 |
| 48.5 | 1751 | 1708 | 1674 | 1644 | 1618 | 1596 | 1576 | 1558 | 1541 | 1526 | 1512 |
| 49.0 | 1760 | 1717 | 1683 | 1653 | 1627 | 1604 | 1584 | 1566 | 1549 | 1534 | 1520 |
| 49.5 | 1769 | 1726 | 1691 | 1661 | 1635 | 1613 | 1592 | 1574 | 1557 | 1542 | 1528 |

The present standards of heat production for the calculation of basal metabolic rates of children are widely divergent and unsatisfactory. Probably the most used are those of Aub and DuBois[1] for children not under fourteen years of age, of Benedict[2] for girls twelve to eighteen years of age, of Benedict and Talbot[3] for girls under twelve years, and of Harris and Benedict[4] for boys of all ages over one year.

In note V[5] of this series (This Journal, Vol.

TABLE II

Expected Calories in Twenty-four Hours

Males 50 Kg. to 74.5 Kg.; 5 years to 15 years. (Females, subtract 10 per cent.)

| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50.0 | 1778 | 1735 | 1700 | 1670 | 1644 | 1621 | 1600 | 1582 | 1565 | 1550 | 1535 |
| 50.5 | 1786 | 1743 | 1708 | 1678 | 1652 | 1629 | 1608 | 1590 | 1573 | 1557 | 1543 |
| 51.0 | 1795 | 1752 | 1716 | 1686 | 1660 | 1637 | 1616 | 1598 | 1581 | 1565 | 1551 |
| 51.5 | 1804 | 1760 | 1724 | 1694 | 1668 | 1645 | 1624 | 1605 | 1588 | 1573 | 1558 |
| 52.0 | 1813 | 1769 | 1733 | 1703 | 1676 | 1653 | 1632 | 1613 | 1596 | 1580 | 1566 |
| 52.5 | 1822 | 1778 | 1742 | 1711 | 1684 | 1661 | 1640 | 1621 | 1604 | 1588 | 1574 |
| 53.0 | 1830 | 1786 | 1750 | 1719 | 1692 | 1669 | 1647 | 1629 | 1611 | 1595 | 1581 |
| 53.5 | 1839 | 1794 | 1758 | 1727 | 1700 | 1676 | 1655 | 1636 | 1619 | 1603 | 1588 |
| 54.0 | 1847 | 1802 | 1766 | 1735 | 1708 | 1684 | 1663 | 1644 | 1626 | 1610 | 1596 |
| 54.5 | 1856 | 1811 | 1775 | 1743 | 1716 | 1692 | 1671 | 1651 | 1634 | 1618 | 1603 |
| 55.0 | 1864 | 1819 | 1783 | 1751 | 1724 | 1700 | 1678 | 1659 | 1641 | 1625 | 1610 |
| 55.5 | 1873 | 1827 | 1791 | 1759 | 1732 | 1708 | 1686 | 1666 | 1649 | 1633 | 1618 |
| 56.0 | 1881 | 1835 | 1799 | 1767 | 1739 | 1715 | 1693 | 1674 | 1656 | 1640 | 1625 |
| 56.5 | 1890 | 1844 | 1807 | 1775 | 1747 | 1723 | 1701 | 1681 | 1664 | 1647 | 1632 |
| 57.0 | 1898 | 1852 | 1815 | 1783 | 1755 | 1730 | 1709 | 1689 | 1671 | 1654 | 1639 |
| 57.5 | 1906 | 1860 | 1823 | 1791 | 1763 | 1738 | 1716 | 1696 | 1678 | 1662 | 1646 |
| 58.0 | 1914 | 1868 | 1830 | 1798 | 1770 | 1745 | 1723 | 1704 | 1685 | 1669 | 1653 |
| 58.5 | 1923 | 1876 | 1838 | 1806 | 1778 | 1753 | 1731 | 1711 | 1693 | 1676 | 1661 |
| 59.0 | 1931 | 1884 | 1846 | 1813 | 1785 | 1760 | 1738 | 1718 | 1700 | 1683 | 1668 |
| 59.5 | 1939 | 1892 | 1854 | 1821 | 1793 | 1768 | 1746 | 1726 | 1707 | 1690 | 1675 |
| 60.0 | 1947 | 1900 | 1862 | 1829 | 1800 | 1775 | 1753 | 1733 | 1714 | 1697 | 1682 |
| 60.5 | 1955 | 1908 | 1870 | 1837 | 1808 | 1783 | 1760 | 1740 | 1721 | 1705 | 1689 |
| 61.0 | 1963 | 1916 | 1877 | 1844 | 1815 | 1790 | 1767 | 1747 | 1729 | 1712 | 1696 |
| 61.5 | 1971 | 1924 | 1885 | 1852 | 1823 | 1798 | 1775 | 1754 | 1736 | 1719 | 1703 |
| 62.0 | 1979 | 1931 | 1892 | 1859 | 1830 | 1805 | 1782 | 1761 | 1742 | 1725 | 1710 |
| 62.5 | 1987 | 1939 | 1900 | 1867 | 1838 | 1812 | 1789 | 1768 | 1749 | 1732 | 1716 |
| 63.0 | 1995 | 1947 | 1908 | 1875 | 1845 | 1819 | 1796 | 1776 | 1757 | 1739 | 1723 |
| 63.5 | 2003 | 1954 | 1915 | 1882 | 1852 | 1826 | 1803 | 1783 | 1764 | 1746 | 1730 |
| 64.0 | 2011 | 1962 | 1923 | 1889 | 1859 | 1834 | 1810 | 1790 | 1771 | 1753 | 1737 |
| 64.5 | 2019 | 1970 | 1930 | 1896 | 1866 | 1841 | 1817 | 1797 | 1777 | 1760 | 1744 |
| 65.0 | 2027 | 1978 | 1938 | 1904 | 1874 | 1848 | 1824 | 1803 | 1784 | 1767 | 1751 |
| 65.5 | 2034 | 1985 | 1945 | 1911 | 1881 | 1855 | 1831 | 1810 | 1791 | 1774 | 1757 |
| 66.0 | 2042 | 1993 | 1952 | 1918 | 1888 | 1862 | 1838 | 1817 | 1798 | 1780 | 1764 |
| 66.5 | 2050 | 2000 | 1959 | 1925 | 1895 | 1869 | 1845 | 1824 | 1805 | 1787 | 1771 |
| 67.0 | 2058 | 2008 | 1967 | 1933 | 1903 | 1876 | 1852 | 1831 | 1812 | 1794 | 1777 |
| 67.5 | 2065 | 2015 | 1974 | 1940 | 1910 | 1883 | 1859 | 1838 | 1818 | 1800 | 1784 |
| 68.0 | 2073 | 2023 | 1982 | 1947 | 1917 | 1890 | 1866 | 1845 | 1825 | 1807 | 1790 |
| 68.5 | 2081 | 2030 | 1989 | 1954 | 1924 | 1897 | 1873 | 1851 | 1832 | 1814 | 1797 |
| 69.0 | 2088 | 2037 | 1996 | 1961 | 1931 | 1904 | 1880 | 1858 | 1838 | 1820 | 1804 |
| 69.5 | 2096 | 2045 | 2004 | 1968 | 1938 | 1911 | 1887 | 1865 | 1845 | 1827 | 1810 |
| 70.0 | 2103 | 2052 | 2011 | 1975 | 1945 | 1918 | 1893 | 1872 | 1852 | 1833 | 1817 |
| 70.5 | 2111 | 2060 | 2018 | 1982 | 1952 | 1924 | 1900 | 1878 | 1858 | 1840 | 1823 |
| 71.0 | 2118 | 2067 | 2025 | 1989 | 1959 | 1931 | 1907 | 1885 | 1865 | 1847 | 1830 |
| 71.5 | 2126 | 2074 | 2032 | 1996 | 1965 | 1938 | 1914 | 1892 | 1871 | 1853 | 1836 |
| 72.0 | 2133 | 2081 | 2039 | 2003 | 1972 | 1945 | 1920 | 1898 | 1878 | 1859 | 1842 |
| 72.5 | 2140 | 2088 | 2046 | 2010 | 1979 | 1952 | 1927 | 1905 | 1884 | 1866 | 1849 |
| 73.0 | 2148 | 2096 | 2054 | 2017 | 1986 | 1958 | 1933 | 1911 | 1891 | 1872 | 1855 |
| 73.5 | 2155 | 2103 | 2061 | 2024 | 1993 | 1965 | 1940 | 1918 | 1897 | 1879 | 1861 |
| 74.0 | 2162 | 2110 | 2068 | 2031 | 1999 | 1972 | 1947 | 1924 | 1904 | 1885 | 1868 |
| 74.5 | 2170 | 2117 | 2075 | 2038 | 2006 | 1978 | 1953 | 1931 | 1910 | 1892 | 1874 |

189, No. 7, Aug. 16, 1923) were published the values of Dreyer's formula for expected twenty-four hour heat production of males from 16 to 80 years of age and from 25 to 124.5 Kg. in weight. Dreyer's preliminary communication[6] implied that his formulas were applicable to all individuals except those under 5 years of age. Since data justifying their use below age 16 were not presented, it was deemed advisable not to tabulate the values below this age in the pre-

TABLE III

Expected Calories in Twenty-four Hours

Males 75 Kg. to 99.5 Kg.; 5 years to 15 years. (Females, subtract 10 per cent.)

| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75.0 | 2177 | 2124 | 2082 | 2045 | 2013 | 1985 | 1960 | 1937 | 1917 | 1898 | 1881 |
| 75.5 | 2184 | 2131 | 2089 | 2052 | 2020 | 1991 | 1966 | 1944 | 1923 | 1904 | 1887 |
| 76.0 | 2192 | 2138 | 2095 | 2058 | 2026 | 1998 | 1973 | 1950 | 1929 | 1910 | 1893 |
| 76.5 | 2199 | 2145 | 2102 | 2065 | 2033 | 2005 | 1979 | 1957 | 1936 | 1917 | 1899 |
| 77.0 | 2206 | 2152 | 2109 | 2072 | 2040 | 2011 | 1986 | 1963 | 1942 | 1923 | 1905 |
| 77.5 | 2213 | 2159 | 2116 | 2079 | 2046 | 2018 | 1992 | 1969 | 1948 | 1929 | 1911 |
| 78.0 | 2220 | 2166 | 2123 | 2086 | 2053 | 2024 | 1999 | 1976 | 1955 | 1935 | 1918 |
| 78.5 | 2227 | 2173 | 2130 | 2092 | 2059 | 2031 | 2005 | 1982 | 1961 | 1942 | 1924 |
| 79.0 | 2234 | 2180 | 2137 | 2099 | 2066 | 2037 | 2011 | 1988 | 1967 | 1948 | 1930 |
| 79.5 | 2241 | 2187 | 2143 | 2105 | 2072 | 2044 | 2018 | 1995 | 1973 | 1954 | 1936 |
| 80.0 | 2248 | 2194 | 2150 | 2112 | 2079 | 2050 | 2024 | 2001 | 1980 | 1960 | 1942 |
| 80.5 | 2255 | 2201 | 2157 | 2118 | 2085 | 2056 | 2030 | 2007 | 1986 | 1966 | 1948 |
| 81.0 | 2262 | 2208 | 2164 | 2125 | 2092 | 2063 | 2037 | 2013 | 1992 | 1972 | 1954 |
| 81.5 | 2269 | 2214 | 2170 | 2131 | 2098 | 2069 | 2043 | 2019 | 1998 | 1978 | 1960 |
| 82.0 | 2276 | 2221 | 2177 | 2138 | 2105 | 2075 | 2049 | 2026 | 2004 | 1984 | 1966 |
| 82.5 | 2283 | 2228 | 2183 | 2144 | 2111 | 2082 | 2055 | 2032 | 2010 | 1990 | 1972 |
| 83.0 | 2290 | 2235 | 2190 | 2151 | 2118 | 2088 | 2062 | 2038 | 2016 | 1996 | 1978 |
| 83.5 | 2297 | 2241 | 2196 | 2157 | 2124 | 2094 | 2068 | 2044 | 2022 | 2002 | 1984 |
| 84.0 | 2304 | 2248 | 2203 | 2164 | 2131 | 2101 | 2074 | 2050 | 2028 | 2008 | 1990 |
| 84.5 | 2311 | 2255 | 2209 | 2170 | 2137 | 2107 | 2081 | 2056 | 2034 | 2014 | 1996 |
| 85.0 | 2318 | 2262 | 2216 | 2177 | 2143 | 2113 | 2087 | 2063 | 2040 | 2021 | 2002 |
| 85.5 | 2325 | 2269 | 2223 | 2184 | 2150 | 2119 | 2093 | 2069 | 2046 | 2027 | 2008 |
| 86.0 | 2331 | 2275 | 2229 | 2190 | 2156 | 2125 | 2099 | 2075 | 2053 | 2032 | 2014 |
| 86.5 | 2338 | 2281 | 2235 | 2196 | 2162 | 2132 | 2105 | 2081 | 2058 | 2038 | 2019 |
| 87.0 | 2345 | 2288 | 2242 | 2202 | 2168 | 2138 | 2111 | 2086 | 2064 | 2044 | 2025 |
| 87.5 | 2351 | 2294 | 2248 | 2208 | 2174 | 2144 | 2117 | 2092 | 2070 | 2050 | 2031 |
| 88.0 | 2358 | 2301 | 2255 | 2214 | 2180 | 2150 | 2123 | 2098 | 2076 | 2056 | 2037 |
| 88.5 | 2365 | 2308 | 2262 | 2221 | 2187 | 2156 | 2129 | 2104 | 2082 | 2062 | 2043 |
| 89.0 | 2372 | 2314 | 2268 | 2227 | 2193 | 2162 | 2135 | 2110 | 2088 | 2067 | 2048 |
| 89.5 | 2378 | 2320 | 2274 | 2233 | 2199 | 2168 | 2141 | 2116 | 2094 | 2073 | 2054 |
| 90.0 | 2385 | 2327 | 2280 | 2239 | 2205 | 2174 | 2147 | 2122 | 2100 | 2079 | 2060 |
| 90.5 | 2391 | 2333 | 2286 | 2245 | 2211 | 2180 | 2153 | 2128 | 2105 | 2085 | 2066 |
| 91.0 | 2398 | 2340 | 2293 | 2252 | 2217 | 2186 | 2159 | 2134 | 2111 | 2090 | 2071 |
| 91.5 | 2405 | 2346 | 2299 | 2258 | 2223 | 2192 | 2165 | 2140 | 2117 | 2096 | 2077 |
| 92.0 | 2411 | 2352 | 2305 | 2264 | 2229 | 2198 | 2171 | 2146 | 2123 | 2102 | 2083 |
| 92.5 | 2418 | 2359 | 2312 | 2271 | 2236 | 2204 | 2176 | 2151 | 2129 | 2108 | 2088 |
| 93.0 | 2424 | 2365 | 2318 | 2277 | 2242 | 2210 | 2182 | 2157 | 2134 | 2113 | 2094 |
| 93.5 | 2431 | 2372 | 2324 | 2283 | 2248 | 2216 | 2188 | 2163 | 2140 | 2119 | 2100 |
| 94.0 | 2437 | 2378 | 2330 | 2289 | 2254 | 2222 | 2194 | 2169 | 2146 | 2125 | 2105 |
| 94.5 | 2444 | 2385 | 2337 | 2295 | 2260 | 2228 | 2200 | 2175 | 2151 | 2130 | 2111 |
| 95.0 | 2450 | 2391 | 2343 | 2301 | 2266 | 2234 | 2206 | 2180 | 2157 | 2136 | 2116 |
| 95.5 | 2457 | 2397 | 2349 | 2307 | 2271 | 2240 | 2211 | 2186 | 2163 | 2142 | 2122 |
| 96.0 | 2463 | 2403 | 2355 | 2313 | 2277 | 2246 | 2217 | 2192 | 2168 | 2147 | 2127 |
| 96.5 | 2469 | 2409 | 2361 | 2319 | 2283 | 2251 | 2223 | 2197 | 2174 | 2153 | 2133 |
| 97.0 | 2476 | 2416 | 2367 | 2325 | 2289 | 2257 | 2229 | 2203 | 2180 | 2158 | 2138 |
| 97.5 | 2482 | 2422 | 2373 | 2331 | 2295 | 2263 | 2235 | 2209 | 2185 | 2164 | 2144 |
| 98.0 | 2489 | 2428 | 2379 | 2337 | 2301 | 2269 | 2240 | 2214 | 2191 | 2170 | 2149 |
| 98.5 | 2495 | 2434 | 2385 | 2343 | 2307 | 2275 | 2246 | 2220 | 2197 | 2175 | 2155 |
| 99.0 | 2502 | 2441 | 2392 | 2349 | 2313 | 2280 | 2252 | 2226 | 2202 | 2180 | 2160 |
| 99.5 | 2508 | 2447 | 2398 | 2355 | 2319 | 2286 | 2257 | 2231 | 2208 | 2186 | 2166 |

ceding note. Hobson[7] states that the Dreyer formulas are applicable to all individuals except those below five years of age. It seemed desirable, in view of the present chaotic state of standards for children, to make more available the Dreyer standards from ages 5 to 16, if only for purposes of comparison with the several other advocated standards.

The accompanying tables together with those of the preceding note give values of the twenty-

TABLE IV

EXPECTED CALORIES IN TWENTY-FOUR HOURS

Males 100 Kg. to 124.5 Kg.; 5 years to 15 years. (Females, subtract 10 per cent.)

| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100.0 | 2514 | 2453 | 2404 | 2361 | 2325 | 2292 | 2263 | 2237 | 2213 | 2191 | 2171 |
| 100.5 | 2520 | 2459 | 2410 | 2367 | 2330 | 2298 | 2269 | 2243 | 2219 | 2197 | 2177 |
| 101.0 | 2526 | 2465 | 2416 | 2373 | 2336 | 2303 | 2274 | 2248 | 2224 | 2202 | 2182 |
| 101.5 | 2533 | 2471 | 2422 | 2379 | 2342 | 2309 | 2280 | 2253 | 2230 | 2208 | 2188 |
| 102.0 | 2539 | 2477 | 2427 | 2384 | 2347 | 2315 | 2285 | 2259 | 2236 | 2213 | 2193 |
| 102.5 | 2545 | 2483 | 2433 | 2390 | 2353 | 2320 | 2291 | 2265 | 2241 | 2219 | 2198 |
| 103.0 | 2551 | 2489 | 2439 | 2396 | 2359 | 2326 | 2297 | 2270 | 2246 | 2224 | 2204 |
| 103.5 | 2557 | 2495 | 2445 | 2402 | 2365 | 2332 | 2302 | 2276 | 2252 | 2229 | 2209 |
| 104.0 | 2564 | 2501 | 2451 | 2408 | 2371 | 2338 | 2308 | 2282 | 2258 | 2235 | 2215 |
| 104.5 | 2570 | 2507 | 2457 | 2413 | 2376 | 2343 | 2313 | 2287 | 2263 | 2240 | 2220 |
| 105.0 | 2576 | 2513 | 2463 | 2419 | 2382 | 2349 | 2319 | 2292 | 2268 | 2245 | 2225 |
| 105.5 | 2582 | 2519 | 2469 | 2425 | 2387 | 2354 | 2324 | 2298 | 2273 | 2251 | 2230 |
| 106.0 | 2588 | 2525 | 2475 | 2431 | 2393 | 2360 | 2330 | 2303 | 2279 | 2256 | 2235 |
| 106.5 | 2594 | 2531 | 2481 | 2437 | 2399 | 2365 | 2335 | 2309 | 2284 | 2262 | 2241 |
| 107.0 | 2600 | 2537 | 2486 | 2442 | 2404 | 2371 | 2341 | 2314 | 2289 | 2267 | 2246 |
| 107.5 | 2606 | 2543 | 2492 | 2448 | 2410 | 2376 | 2346 | 2319 | 2295 | 2272 | 2251 |
| 108.0 | 2612 | 2549 | 2498 | 2454 | 2416 | 2382 | 2352 | 2325 | 2300 | 2277 | 2256 |
| 108.5 | 2619 | 2555 | 2503 | 2459 | 2421 | 2387 | 2357 | 2330 | 2305 | 2283 | 2262 |
| 109.0 | 2625 | 2561 | 2509 | 2465 | 2427 | 2393 | 2363 | 2335 | 2311 | 2288 | 2267 |
| 109.5 | 2631 | 2567 | 2515 | 2470 | 2432 | 2398 | 2368 | 2341 | 2316 | 2293 | 2272 |
| 110.0 | 2637 | 2573 | 2521 | 2476 | 2438 | 2404 | 2373 | 2346 | 2321 | 2298 | 2277 |
| 110.5 | 2643 | 2579 | 2527 | 2482 | 2443 | 2409 | 2379 | 2351 | 2326 | 2304 | 2282 |
| 111.0 | 2648 | 2584 | 2532 | 2487 | 2448 | 2414 | 2384 | 2357 | 2332 | 2309 | 2288 |
| 111.5 | 2654 | 2590 | 2538 | 2493 | 2454 | 2420 | 2390 | 2362 | 2337 | 2314 | 2293 |
| 112.0 | 2660 | 2596 | 2544 | 2499 | 2460 | 2426 | 2395 | 2367 | 2342 | 2319 | 2298 |
| 112.5 | 2666 | 2601 | 2549 | 2504 | 2465 | 2431 | 2400 | 2373 | 2347 | 2324 | 2303 |
| 113.0 | 2672 | 2607 | 2555 | 2510 | 2471 | 2436 | 2406 | 2379 | 2353 | 2330 | 2308 |
| 113.5 | 2678 | 2613 | 2560 | 2515 | 2476 | 2442 | 2411 | 2384 | 2358 | 2335 | 2313 |
| 114.0 | 2684 | 2619 | 2566 | 2521 | 2482 | 2447 | 2416 | 2389 | 2363 | 2340 | 2318 |
| 114.5 | 2690 | 2625 | 2572 | 2527 | 2487 | 2452 | 2421 | 2394 | 2368 | 2345 | 2323 |
| 115.0 | 2696 | 2631 | 2578 | 2533 | 2493 | 2458 | 2427 | 2399 | 2373 | 2350 | 2328 |
| 115.5 | 2702 | 2636 | 2583 | 2538 | 2498 | 2463 | 2432 | 2404 | 2379 | 2355 | 2334 |
| 116.0 | 2707 | 2642 | 2589 | 2543 | 2503 | 2468 | 2437 | 2409 | 2384 | 2360 | 2339 |
| 116.5 | 2713 | 2647 | 2594 | 2548 | 2509 | 2474 | 2443 | 2414 | 2389 | 2365 | 2344 |
| 117.0 | 2719 | 2653 | 2600 | 2554 | 2514 | 2479 | 2448 | 2420 | 2394 | 2370 | 2349 |
| 117.5 | 2725 | 2658 | 2605 | 2559 | 2520 | 2484 | 2453 | 2425 | 2399 | 2375 | 2354 |
| 118.0 | 2731 | 2664 | 2611 | 2565 | 2525 | 2490 | 2458 | 2430 | 2404 | 2381 | 2359 |
| 118.5 | 2737 | 2670 | 2616 | 2570 | 2530 | 2495 | 2463 | 2435 | 2409 | 2386 | 2364 |
| 119.0 | 2743 | 2676 | 2622 | 2576 | 2536 | 2500 | 2469 | 2440 | 2414 | 2391 | 2369 |
| 119.5 | 2748 | 2681 | 2627 | 2581 | 2541 | 2505 | 2474 | 2445 | 2419 | 2396 | 2374 |
| 120.0 | 2754 | 2687 | 2633 | 2586 | 2547 | 2511 | 2479 | 2450 | 2424 | 2401 | 2379 |
| 120.5 | 2760 | 2693 | 2639 | 2592 | 2552 | 2516 | 2484 | 2456 | 2429 | 2406 | 2383 |
| 121.0 | 2765 | 2698 | 2644 | 2597 | 2557 | 2521 | 2489 | 2461 | 2434 | 2411 | 2388 |
| 121.5 | 2771 | 2704 | 2649 | 2602 | 2562 | 2526 | 2494 | 2466 | 2440 | 2416 | 2393 |
| 122.0 | 2777 | 2710 | 2655 | 2608 | 2567 | 2532 | 2500 | 2471 | 2445 | 2421 | 2398 |
| 122.5 | 2782 | 2715 | 2660 | 2613 | 2573 | 2537 | 2505 | 2476 | 2450 | 2426 | 2403 |
| 123.0 | 2788 | 2721 | 2666 | 2619 | 2578 | 2542 | 2510 | 2481 | 2455 | 2431 | 2408 |
| 123.5 | 2794 | 2726 | 2671 | 2624 | 2583 | 2547 | 2515 | 2486 | 2460 | 2436 | 2413 |
| 124.0 | 2800 | 2731 | 2676 | 2629 | 2588 | 2552 | 2520 | 2491 | 2464 | 2441 | 2418 |
| 124.5 | 2806 | 2737 | 2682 | 2635 | 2594 | 2558 | 2526 | 2497 | 2470 | 2446 | 2423 |

**four hour heat production of males from 5 to 80 years of age and from 25 to 125 Kg. in weight. Values for females are obtained by subtracting 10 per cent from the tabulated values for males.**

**Thanks are due George E. Redfern for the greater part of the calculation.**

### SUMMARY

**Values of Dreyer's formulas for expected heat production are tabulated for males, 5 to 15 years of age and from weights 25 to 125 kilograms, supplementing tables of the preceding note of this series.**

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# NOTES ON BASAL METABOLISM VII: ACTUAL VERSUS THEORETIC WEIGHT IN DREYER'S FORMULAS

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IN note V[1] of this series (This JOURNAL, Vol. 189, No. 7, Aug. 16, 1923) there were tabulated the values of Dreyer's formula[2] for the prediction of daily heat production (h) based upon weight in grams (w) and age in years (a).

$$h = \frac{\sqrt{w}}{0.1015\ a^{0.1333}}$$

In that note the statement was made that, "for routine clinical determinations, the values, based upon actual weight and age,--are of sufficient accuracy." Boothby and Sandiford[3], criticizing this recommendation, state that such standards may harm the individual patient of markedly over or under weight. Similar criticism applies to all biometric laws derived statistically from the measurements of normals,—to the Harris and Benedict, and to the Aub and Du Bois standards. The greater the variation in form of the individual from the statistical average of the normal series, the greater will be the error in the application of the derived formula.

Boothby and Sandiford apparently base their criticism upon an undemonstrated assertion in Dreyer's preliminary communication. He shows the deviation between observation and calculation for Benedict's own series to be less by his (Dreyer's) than by the Harris and Benedict formula and states that "the deviations in the case of the author's formula will be considerably reduced if trunk length and chest circumference are considered"; that is, if actual is substituted for a theoretic weight,—the arithmetic mean of wλ and $w_{ch}$ in the following formulas:

$$w\lambda = \sqrt[0.319]{0.38025\lambda}$$

$$w_{ch} = \sqrt[0.365]{0.662ch}$$

In which, wλ = theoretic weight in grams based upon sitting height in cm. (λ).
and $w_{ch}$ = theoretic weight in kilograms based upon chest circumference in cm. (ch).

The actual data on this point have not appeared and the assertion remains undemonstrated.

Dreyer derived his formula from the Harris and Benedict[4] series of normals by ignoring stature. Correlation was wholly upon sex, age and actual weight. The measurements, chest circumferences and stem lengths, necessary for the calculation of the theoretic weights, were unavailable in this series. The existence of closer coördination of this normal series to Dreyer's formula than to that of Harris and Benedict indicates the undesirability of stature as a biometric measurement in this connection. Benedict and Talbot[5] similarly have demonstrated this biometric measurement to be unrelated to heat production of children of certain ages.

There is apparently no published evidence indicating that heat production follows variations in the square roots of the actual weights any less closely than the square roots of theoretic weights based upon formulas derived from the sitting heights and chest circumferences of a series of normal individuals. Insofar as experimental results are apparent, the heat production of an overweight or underweight individual may be more closely correlated to the actual or to the theoretic weight. It appears possible that heat production of the individual of abnormal weight may be related more closely to his actual weight than to a figure calculated from measurements of normal individuals of a different form.

Hobson[6], in Dreyer's laboratory, writes that since "the measurements necessary to determine the 'normal (theoretic) weight' of the individual of Benedict's series were not available and the values published in his (Dreyer's) formula were derived from the observed weight; it is

## TABLE I

### NORMAL WEIGHT IN KILOGRAMS (DREYER)

| Ch. or λ Cm. | Male | | Female | |
|---|---|---|---|---|
| | Wλ | $W_{ch}$ | Wλ | $W_{ch}$ |
| 50.5 | 10.6 | 15.0 | 10.4 | 14.7 |
| 51.0 | 10.9 | 15.4 | 10.8 | 15.2 |
| 51.5 | 11.2 | 15.8 | 11.2 | 15.8 |
| 52.0 | 11.6 | 16.2 | 11.6 | 16.3 |
| 52.5 | 11.9 | 16.7 | 12.0 | 16.9 |
| 53.0 | 12.2 | 17.1 | 12.4 | 17.4 |
| 53.5 | 12.5 | 17.6 | 12.8 | 18.0 |
| 54.0 | 12.8 | 18.0 | 13.2 | 18.6 |
| 54.5 | 13.1 | 18.5 | 13.6 | 19.2 |
| 55.0 | 13.5 | 18.9 | 14.0 | 19.9 |
| 55.5 | 14.0 | 19.4 | 14.4 | 20.5 |
| 56.0 | 14.5 | 19.9 | 14.8 | 21.2 |
| 56.5 | 15.0 | 20.4 | 15.3 | 21.8 |
| 57.0 | 15.4 | 20.9 | 15.7 | 22.5 |
| 57.5 | 15.8 | 21.4 | 16.1 | 23.2 |
| 58.0 | 16.2 | 21.9 | 16.6 | 23.9 |
| 58.5 | 16.7 | 22.4 | 17.1 | 24.7 |
| 59.0 | 17.2 | 23.0 | 17.5 | 25.4 |
| 59.5 | 17.6 | 23.5 | 18.0 | 26.2 |
| 60.0 | 18.1 | 24.0 | 18.5 | 27.0 |
| 60.5 | 18.6 | 24.6 | 19.0 | 27.8 |
| 61.0 | 19.1 | 25.2 | 19.5 | 28.6 |
| 61.5 | 19.6 | 25.7 | 20.0 | 29.4 |
| 62.0 | 20.1 | 26.3 | 20.5 | 30.3 |
| 62.5 | 20.6 | 26.9 | 21.1 | 31.1 |
| 63.0 | 21.1 | 27.5 | 21.6 | 32.0 |
| 63.5 | 21.6 | 28.1 | 22.2 | 32.9 |
| 64.0 | 22.2 | 28.7 | 22.7 | 33.8 |
| 64.5 | 22.7 | 29.3 | 23.3 | 34.8 |
| 65.0 | 23.3 | 29.9 | 23.9 | 35.7 |
| 65.5 | 23.8 | 30.6 | 24.5 | 36.7 |
| 66.0 | 24.4 | 31.2 | 25.1 | 37.7 |
| 66.5 | 25.0 | 31.9 | 25.7 | 38.7 |
| 67.0 | 25.6 | 32.5 | 26.3 | 39.8 |
| 67.5 | 26.2 | 33.2 | 27.0 | 40.9 |
| 68.0 | 26.8 | 33.9 | 27.6 | 41.9 |
| 68.5 | 27.4 | 34.6 | 28.3 | 43.0 |
| 69.0 | 28.1 | 35.3 | 28.9 | 44.1 |
| 69.5 | 28.7 | 36.0 | 29.6 | 45.3 |
| 70.0 | 29.4 | 36.7 | 30.3 | 46.4 |
| 70.5 | 30.0 | 37.4 | 31.0 | 47.6 |
| 71.0 | 30.7 | 38.1 | 31.7 | 48.8 |
| 71.5 | 31.4 | 38.9 | 32.4 | 50.0 |
| 72.0 | 32.1 | 39.6 | 33.1 | 51.2 |
| 72.5 | 32.8 | 40.4 | 33.9 | 52.5 |
| 73.0 | 33.5 | 41.1 | 34.6 | 53.8 |
| 73.5 | 34.2 | 41.9 | 35.4 | 55.1 |
| 74.0 | 34.9 | 42.7 | 36.1 | 56.4 |
| 74.5 | 35.7 | 43.5 | 36.9 | 57.8 |
| 75.0 | 36.4 | 44.3 | 37.7 | 59.2 |
| 75.5 | 37.2 | 45.1 | 38.5 | 60.6 |
| 76.0 | 38.0 | 46.0 | 39.4 | 62.0 |
| 76.5 | 38.8 | 46.8 | 40.2 | 63.4 |
| 77.0 | 39.6 | 47.6 | 41.0 | 64.9 |
| 77.5 | 40.4 | 48.5 | 41.9 | 66.4 |
| 78.0 | 41.2 | 49.3 | 42.8 | 67.9 |
| 78.5 | 42.0 | 50.2 | 43.7 | 69.5 |
| 79.0 | 42.9 | 51.1 | 44.6 | 71.0 |
| 79.5 | 43.8 | 52.0 | 45.5 | 72.6 |
| 80.0 | 44.6 | 52.9 | 46.4 | 74.3 |
| 80.5 | 45.5 | 53.8 | 47.3 | 75.9 |
| 81.0 | 46.4 | 54.7 | 48.2 | 77.6 |
| 81.5 | 47.3 | 55.6 | 49.2 | 79.3 |
| 82.0 | 48.2 | 56.6 | 50.2 | 81.0 |
| 82.5 | 49.1 | 57.5 | 51.2 | 82.8 |
| 83.0 | 50.1 | 58.5 | 52.2 | 84.5 |
| 83.5 | 51.0 | 59.5 | 53.2 | 86.3 |
| 84.0 | 52.0 | 60.4 | 54.2 | 88.2 |
| 84.5 | 53.0 | 61.4 | 55.2 | 90.0 |
| 85.0 | 53.9 | 62.4 | 56.3 | 91.9 |
| 85.5 | 54.9 | 63.4 | 57.3 | 93.8 |
| 86.0 | 56.0 | 64.5 | 58.4 | 95.8 |
| 86.5 | 57.0 | 65.5 | 59.5 | 97.8 |
| 87.0 | 58.0 | 66.5 | 60.6 | 99.8 |
| 87.5 | 59.1 | 67.6 | 61.7 | 101.8 |
| 88.0 | 60.1 | 68.6 | 62.9 | 103.9 |
| 88.5 | 61.2 | 69.7 | 64.0 | 106.0 |
| 89.0 | 62.3 | 70.8 | 65.2 | 108.1 |
| 89.5 | 63.4 | 71.9 | 66.4 | 110.3 |
| 90.0 | 64.5 | 73.0 | 67.6 | 112.4 |
| 90.5 | 65.7 | 74.1 | 68.8 | 114.6 |
| 91.0 | 66.8 | 75.2 | 70.0 | 116.9 |
| 91.5 | 68.0 | 76.4 | 71.2 | 119.1 |
| 92.0 | 69.1 | 77.5 | 72.5 | 121.4 |
| 92.5 | 70.3 | 78.7 | 73.7 | 123.7 |
| 93.0 | 71.5 | 79.9 | 75.0 | 126.1 |
| 93.5 | 72.7 | 81.0 | 76.3 | 128.6 |
| 94.0 | 74.0 | 82.2 | 77.6 | 131.0 |
| 94.5 | 75.2 | 83.4 | 78.9 | 133.5 |
| 95.0 | 76.5 | 84.7 | 80.3 | 136.0 |
| 95.5 | 77.7 | 85.9 | 81.6 | 138.5 |
| 96.0 | 79.0 | 87.1 | 83.0 | 141.1 |
| 96.5 | 80.3 | 88.4 | 84.4 | 143.7 |
| 97.0 | 81.6 | 89.6 | 85.8 | 146.3 |
| 97.5 | 82.9 | 90.9 | 87.2 | 149.0 |
| 98.0 | 84.3 | 92.2 | 88.7 | 151.7 |
| 98.5 | 85.6 | 93.5 | 90.1 | 154.5 |
| 99.0 | 87.0 | 94.8 | 91.6 | 157.2 |
| 99.5 | 88.4 | 96.1 | 93.1 | 160.0 |
| 100.0 | 89.8 | 97.4 | 94.6 | 162.8 |
| 100.5 | 91.2 | 98.8 | 96.1 | 165.7 |
| 101.0 | 92.6 | 100.1 | 97.6 | 168.7 |
| 101.5 | 94.1 | 101.5 | 99.2 | 171.6 |
| 102.0 | 95.5 | 102.9 | 100.8 | 174.6 |
| 102.5 | 97.0 | 104.2 | 102.3 | 177.7 |
| 103.0 | 98.5 | 105.6 | 103.9 | 180.8 |
| 103.5 | 100.0 | 107.1 | 105.6 | 183.9 |
| 104.0 | 101.5 | 108.5 | 107.2 | 187.0 |
| 104.5 | 103.1 | 109.9 | 108.9 | 190.1 |
| 105.0 | 104.6 | 111.4 | 110.6 | 193.3 |
| 105.5 | 106.2 | 112.8 | 112.3 | 196.6 |
| 106.0 | 107.8 | 114.3 | 114.0 | 199.9 |
| 106.5 | 109.4 | 115.8 | 115.7 | 203.2 |
| 107.0 | 111.0 | 117.3 | 117.4 | 206.6 |
| 107.5 | 112.6 | 118.8 | 119.2 | 210.1 |
| 108.0 | 114.3 | 120.3 | 120.9 | 213.6 |
| 108.5 | 116.0 | 121.8 | 122.7 | 217.2 |
| 109.0 | 117.6 | 123.4 | 124.5 | 220.7 |
| 109.5 | 119.3 | 124.9 | 126.4 | 224.2 |
| 110.0 | 121.1 | 126.5 | 128.3 | 227.8 |
| 110.5 | 122.8 | 128.1 | 130.1 | 231.5 |
| 111.0 | 124.5 | 129.7 | 132.0 | 235.3 |
| 111.5 | 126.3 | 131.3 | 133.9 | 239.0 |
| 112.0 | 128.1 | 132.9 | 135.8 | 242.8 |
| 112.5 | 129.9 | 134.5 | 137.8 | 246.6 |
| 113.0 | 131.7 | 136.2 | 139.8 | 250.4 |
| 113.5 | 133.5 | 137.8 | 141.8 | 254.3 |
| 114.0 | 135.4 | 139.4 | 143.7 | 258.3 |
| 114.5 | 137.3 | 141.1 | 145.7 | 262.3 |
| 115.0 | 139.2 | 142.8 | 147.8 | 266.4 |

possible that these values may require some slight modification." He correlates the daily heat production of 46 normal men with age and theoretic weight based upon sitting heights and chest circumferences and concludes "that for individuals leading a healthy active life, . . . the $K$ in Dreyer's formula will be found to be approximately 0.0990 instead of 0.1015," a change of approximately 2.5 per cent in the value of the formula.

This tends to indicate that the original Dreyer formula is probably more accurate when actual than when theoretic weight is employed, and that when theoretic weight is employed some modification of the formula should be applied.

Hobson's 46 cases were analyzed with a view to determining the differences in the basal metabolic rates when calculated upon actual and upon theoretic weights from the original formula.

It seemed desirable in this connection to determine the magnitude of the variation of the actual from the theoretic weight of the average hospital patient. Fifty males (ages, 9 to 77 years; weights 33 to 118 kg.; statures, 135.5 to 185 cm.; sitting heights, 67.5 to 92 cm.; chest circumferences 61.5 to 128.5 cm.) and fifty females (ages, 14 to 80 years; weights, 37 to 93 kg.; statures, 137.5 to 168 cm.; sitting heights, 72 to 85 cm.; chest circumferences, 63 to 96.5 cm.) were chosen at random from the patients of these hospitals. In the males the actual varied from the theoretic weight by 0.5 per cent and in the females 1.6 per cent. This variation of 1 per cent approximates in magnitude the experimental error of the measurements involved. It becomes, therefore, a matter of indifference, as stated by Boothby and Sandiford[3], which of the two weights is employed in calculating the heat production of an individual of normal or nearly normal weight. The maximum variations of actual from theoretic weight in these two series were: for males, +24 and —21 per cent; and for females +24 and —29 per cent. The differences in the heat production of each of these four maximally deviating individuals calculated from the actual weight and from the theoretic weight may be no greater than the error of applying the formulas of Harris and Benedict or the normal values of Aub and DuBois[7] both of which represent statistical averages of normal individuals. Basal metabolic rates of Hobson's series averaged approximately +3% using theoretic weights in the original Dreyer formula and approximately +7% using actual weights in the original formula. This deviation from the normal basal metabolic rate was due to an average 5 per cent deficiency in actual weight compared to theoretic weight in this series. "This is largely accounted for by the fact that the series comprises athletic individuals whose chest development is greater than the average, and whose calculated weight by Dreyer's tables tends, therefore, to be on the + side." This 5 per cent deficiency in actual weight weakens the applicability to clinical work either of the Dreyer normal weight formulas or of the Hobson series. A variation of a certain per cent between the theoretic and actual weight introduces a variation of less than half that amount in the calculated heat production, since $h$ varies as the square root of $w$.

In these hospitals basal metabolic rates calculated from the Dreyer standards are not reported clinically. The Harris and Benedict standards have been used uniformly for five years while the Dreyer, by theoretic and actual weights, and the Aub and DuBois results are tabulated only for purposes of comparison. The policy here has been the much quoted one of Means and Woodwell[8] to adhere to the standard used in the past as long as "the others appear to possess no material advantage over it."

Values of $w\lambda$ and $w_{ch}$ for the measurements usually encountered have been tabulated by Dreyer and Hanson[9]. Since the measurements of many hospital patients fall outside this tabulation it became necessary to extend the tables. The accompanying table in the metric system to three significant figures, may be useful to others in determining theoretic weight for calculating basal metabolic rate from the Dreyer formulas or for determining normal weights for dietary or other therapeutic purposes.

Thanks are due George E. Redfern for the greater part of the routine calculation.

## SUMMARY

Theoretic weight based upon trunk length and chest circumference appears to have no advantage over actual weight in predicting heat production by Dreyer's original formula for the following reasons: (1) The formula was derived from actual, not theoretic weights. (2) Variation of actual from theoretic weight of the average hospital patient is but 1 per cent. (3) This 1 per cent variation influences the basal metabolic rate by less than 0.5 per cent. (4) The error introduced into the determination of basal metabolic rate of the patient of abnormal weight by using the actual for the theoretic weight is probably no greater than by using the actual biometric measurements of such a patient in any other formula or table derived statistically from normal subjects. Values of Dreyer's normal weight formulas are tabulated.

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# BOOK REVIEWS

***The Human Testis and its Diseases.*** **By Max Thorek, M.D. Published by J. B. Lippincott Company, Philadelphia and London. 548 pages. 308 illustrations.**

In this book Thorek has gathered together a large amount of evidence dealing with the physiology of the testis particularly as regards its internal secretion. To the accumulated evidence he adds numerous observations of his own, and concludes that without doubt the gland elaborates an internal secretion. There is a definite relationship between the gonads and the other endocrine glands, which Thorek discusses with thoroughness.

The question of testicular transplantation is considered in a very complete yet critical manner. The experiments of Steinach, Voronoff and others are reviewed, and to these are added many observations made by the author himself. Thorek's summary of the indications for "therapeutic gonadal implantation," as he prefers to call it, reflects a critical judgment, and does not claim more for this measure than common sense can sustain.

That portion of the book which deals with diseases of the testis is distinctly less meritorious than the portion which concerns its physiology. The author frequently speaks of gonorrhoeal "orchi-epididymitis," although everyone knows that the testis is very rarely, if at all, invaded by the gonococcus. "In well-developed primary tuberculosis of the testicle or epididymis, castration ought to be complete and radical" (p. 534), he says; but castration when the epididymis alone is tuberculous is a surgical crime.

We were not particularly impressed by that portion of the book which deals with the general surgery of the testicle, for it gives the impression of being written more by means of abstracts from the literature than from the author's experience. Yet this phase of testicular disease is well enough understood to require very little exposition. The resumé of the recent work on internal secretion and transplantation is the important part of the book; this part is very well done and makes Thorek's monograph a truly valuable contribution to modern medicine.

***Practical Surgery, Illustrated.*** **By Victor Pauchet. Translated by F. R. B. Atkinson, M.D., C.M. (Edinburgh University). With an Introduction by Sir Charles Gordon Watson, C.M.G., F.R.C.S., Surgeon and Joint Lecturer in Surgery, St. Bartholomew's Hospital. Ernest Benn, Ltd., London. 1924.**

This most unusual treatise on surgery, of which two volumes have already appeared, is essentially not a text-book of surgery; it is, on the other hand, surgery of a master illustrated, the text being simply a description of the operative procedure. All drawings are taken from life, having been made during the actual course of the operation in question, and the text has been written to describe and explain these drawings.

Volume I contains 293 pages, with an introduction by the translator, author's preface, and table of contents.

The first chapter is unusual in that it is rarely seen in surgical text-books; it is entitled "Surgical Organization Excluding the Large Centers," and describes briefly the installation of a small surgical working hospital. Descriptions of instruments and drugs and dressings necessary, preparation of patients, tying of knots, etc., are described. The second chapter is devoted to femoral hernia. Chapter three to the radical cure of inguinal hernia, the operation for which differs considerably from the ordinary Bassini performed in America and in England.

The author treats gangrenous appendicitis with peritonitis very briefly, but it is evident from his short chapter and his description that he places very much dependence upon much more adequate drainage than is employed in the United States. One illustration alone pictures seven large rubber tube drains directed to various parts of the abdominal cavity.

It is noticeable that practically all of his operations are done under local, spinal or splanchnic anesthesia. The treatment of hemorrhoids is by local or sacral anesthesia by the Whitehead method. The cautery is practically never used.

The author describes postoperative hernia as "eventration after operation," and for this condition he uses sutures of bronze wire passed through all the tissue except the peritoneum. For pelvic operations the author uses the transverse suprapubic incision. His operation for vesico-vaginal fistula is extremely wide, almost radical, but impresses one that it should effect a permanent cure. His operation for cancer of the rectum is even more extensive than the well-planned, but extensive, Coffey procedure. He gives a very concise outline of the reasons for and against the one- or two-stage abdomino-perineal operation. Intestinal stasis he describes as Lane's disease, and discusses it in its medical and surgical aspects. The illustrations of the procedure of total colectomy and ileo-sigmoidostomy are profuse and very adequate.

When the author does a gastroenterostomy he does not close the pylorus; he prefers gastrectomy for gastric and pyloric ulcers. He does not advise gastroenterostomy at the time of repair of a perforated gastric ulcer. His remarks on postoperative jejunal ulcer are very much up to date. The translator considers his chapter on this condition as the most attractive and instructive in this most striking and original volume.

Volume II opens with a description of cerebellar decompression under local anesthesia for the treatment of tumor of the auditory nerve. He then discusses treatment of cancer of the cervix, both by radium and by operation. He employs radium before operation but not afterward. He describes radium treatment as Curietherapy, and he believes that the curative value of radium is at least equal to that of surgery, and argues that, as it requires neither operation nor anesthesia, it should be the treatment of choice.

The total extirpation of the stomach for carcinoma is described. In this operation the esophagus is fitted end to side into the jejunum and a jejunostomy is also carried out to prevent regurgitation of bile into the esophagus. The author recommends complete colectomy for congenital mega-colon in a majority of cases, as he considers it an easier and milder operation than partial colectomy. The last chapter of this volume also discusses cancer of the rectum. The author describes the radical method of doing colostomy.

The illustrations throughout this remarkable contribution to surgery are extremely vivid, unusual, and give a most perfect description of the operation without the need of reference to the text. The text is simple, straightforward, and easy to understand.

This work is a distinct addition to modern surgical writings. One would naturally look forward eagerly to the publication of further volumes by this extremely versatile author.

# Case Records of the Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY
RICHARD C. CABOT, M.D., AND HUGH CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

## CASE 10481

*First entry.* An American of forty-nine, for many years a deck steward, for two years a laborer, entered June 7 complaining of dyspnea of six weeks' duration.

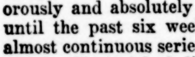
F. H. Good, except that his wife had never been pregnant.

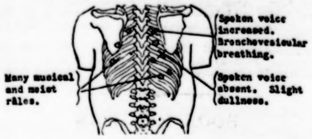
P. H. He had always been strong and well, and never ill in bed. He had occasional colds. He urinated three times at night.

*Habits.* For four years he had taken two or three glasses of whiskey a day. Before that he took beer and ale.

P. I. He denied rheumatic or luetic disease except "venereal warts," and had worked vigorously and absolutely without symptomatology until the past six weeks, when he had had an almost continuous series of colds with productive cough. He had had difficulty in breathing during exertion, although this did not interfere to any extent with his working. Three weeks after the onset he began to have considerable though not intense or prolonged precordial pain accompanying the dyspnea, and a feeling of suffocation and cardiac constriction without radiation, forcing him to stop and rest. At the same time he began to urinate three times at night. Soon after this, with the increase of dyspnea, cough and pain he had orthopnea, tachycardia and palpitation. He continued at work. For the past three days however he had been much worse. Edema appeared very suddenly in his legs, genitals and abdomen. He had to let out his belt four holes in one day. He had soreness in the right upper quadrant. He had been at home except for a visit to the Out-Patient Department. He had had anorexia, some nausea, but no considerable malaise or weakness.

P. E. An obese man, cyanotic and in some respiratory distress. Mucous membranes cyanotic. Teeth in wretched condition; many gold caps. Marked pyorrhea. *Heart* large; see diagram. Sounds extremely faint. Gallop rhythm. Rate rapid. No murmurs. *B. P.* 180/130-165/115. *Lungs* clear in front. Back as shown in the diagram. *Abdomen* bulging in flanks.




Spoken voice increased. Bronchovesicular breathing.
Many musical and moist râles.
Spoken voice absent. Slight dullness.

Shifting dullness. Fluid wave. Moderate amount of fluid. Liver not felt, but there was a possible sense of resistance in the right upper quadrant. *Genitals.* Moderate edema of the penis, very little of the scrotum. Marked pitting edema of both lower *extremities.*

*T.* 95.7° at entrance, 98.4°-100.2° for the next two days, afterwards not remarkable. *P.* 82-122. *R.* 20-34. *Urine,* ℥ 113 June 9, falling steadily to ℥ 24 June 15, then up to ℥ 37. Sp. gr. 1.010, alkaline at one of two examinations. a trace of albumin at one, leucocytes at one. *Renal function* 45%. *Blood.* Hgb. 90%, leucocytes 12,000-6,200, polynuclears 70%. *Wassermann* negative. *Non-protein nitrogen* 43 mgm. per 100 c.c. *Electrocardiograms. June 11.* Normal rhythm. Rate 75. Bundle branch block. (Only lead II taken. Further observation will tell which bundle.) *June 21.* As before. Right bundle branch block. *Abdominal paracentesis* June 8. 350 c.c. of clear yellow, later blood tinged fluid withdrawn after considerable difficulty; sp. gr. 1.014, rare lymphocytes. Two cultures negative.

*Orders.* June 7. Morphia gr. 1/8 s.c., repeat at 9 p. m. (Patient asleep). Digitalis gr. iii every four hours for five doses. Soft solids without salt. Limit fluids to 1500 c.c. Bed. $MgSO_4$ ℥ iss. June 8. Digitalis gr. iii at 8 a. m., gr. ivss at 8 p. m. Morphia gr. 1/6 every three hours p.r.n. for restlessness. June 9. $MgSO_4$ iss every other morning. Digitalis gr. iii 4 i.d. Caffein sodium salicylate gr. x intramuscularly for failing pulse. June 10. Digitalis gr. iii t.i.d. Nitroglycerin gr. 1/100 4 i.d. Morphia gr. 1/6 s.c. every three hours. June 11. Digitalis gr. iss once i.d. The remaining orders are for morphia in 1/6 grain dosage and one order of nitroglycerin gr. 1/100 June 24.

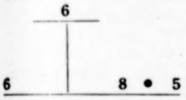
The patient was kept comfortable with narcotics. He made very slow improvement. June 27 he was discharged to the Out-Patient Department with a poor prognosis.

*History of interval.* On discharge the patient went to a camp and did very well until the first of July, when he "caught a cold" which all seemed to settle in the left chest, about the heart, and choked him up. He coughed a good deal, raising much sputum and blood, a teaspoonful of blood at a time, sometimes in clots. He sweat, but had no fever or chill. He was forced to use four pillows, practically having to sit up in bed.

He remained in bed five days. By this time his cough and chest symptoms cleared and he was able to get up and about, though he was not so active as at the time of his first admission. For the first ten days of July his legs and abdomen swelled and his eyelids were puffy at times. He had been rather dyspneic most of the time. After July 5 he passed less urine than usual, and after the 6th felt nervous and twitched. He had taken digitalis gr. iss daily.

*Second entry,* July 11.

P. E. Much as before, with some fluid in the *abdomen,* râles at the bases of the *lungs,* and marked edema of the *extremities.* Fine macular eruption over trunk and back. Liver 11 cm. below the costal margin. Heart measurements as shown in the diagram. *B. P.* 160/135-170/125.



*T.* 97°-102.2°. *P.* 78-136. *R.* 21-47. *Urine.* ℥ 28-67, sp. gr. 1.010-1.024, a trace to a large trace of albumin at all of six examinations, ferric chloride positive at one, 2-5 leucocytes per high power field at two, 2-5 red blood corpuscles at one. *Renal function* 35% at two tests. August 15 10 c.c. of residual urine. *Blood.* Hgb. 100%-80%, leucocytes 14,000-21,600, polynuclears 71%, reds and platelets normal. *Non-protein nitrogen* 44 mgm. July 11, 31 mgm. August 15. *Wassermann* negative. *Sputum.* Blood at both of two examinations. No tubercle bacilli. General profusion of organisms. Many Gram-positive diplococci in chains. A few leucocytes. *Abdominal tap July 29.* 1,000 c.c. of yellowish translucent fluid. Sp. gr. 1.012. Cell count, reds 110, leucocytes 460, large mononuclears about 50%, lymphocytes about 50%, no organisms. Culture, a few staphylococci. *Chest tap* August 12. 2,250 c.c of turbid yellow fluid, sp. gr. 1.014, cell count, reds 120, leucocytes 420, lymphocytes 25%, large mononuclears 71%, polynuclears 4%. *Abdominal tap* August 19. 1,000 c.c. 800 cells, 76% lymphocytes, 24% large mononuclears.

*Orders.* July 11. Soft solids. Digitalis gr. iss 2 i.d. Codein sulphate gr. ½ with veronal gr. x by mouth. Repeat codein sulphate gr. ½ once in two hours if necessary. Nitroglycerin 1/100 under tongue for smothering attacks p.r.n. Codeia gr. 1/2 by mouth. Follow with veronal gr. x if necessary. July 13. $MgSO_4$ ℥ iss. Codein sulphate gr. ½ with veronal gr. x by mouth. Morphia gr. 1/6 s.c. every three hours p.r.n. Digitalis gr. ivss a day. July 14. Morphia gr. 1/6 every three hours p.r.n. July 17. Diuretin gr. x t.i.d. During the remainder of the stay morphia was given in 1/6 to 1/4 grain dosage from once a day to every three hours p.r.n. July 21. Diuretin gr. xx t.i.d. July 22. Veronal gr. x. Repeat once if necessary. July 24. Nitroglycerin gr. 1/150 in glass of water at bedside, to be sipped. July 29. Digitalis gr. iss 2 i.d. July 30. Theocin gr. iv 2 i.d. August 2. Calomel gr. v for five doses four hours apart. August 5. Theocin gr. iv 2 i.d. August 10. Pyramidon gr. v, repeat in an hour if necessary. August 15. Pantopon gr. 1/3 by mouth every six hours for two days. Pyramidon gr. v every six hours alternating with pantopon. August 16. Calcium chlorid ʒ ii (37½%) in ginger ale ℥ iv 6 i.d. Digifolin gr. iss 2 i.d. Digitalis gr. iss by mouth 2 i.d. until the pulse rate drops. Nitroglycerin gr. 1/100 by mouth p.r.n. for pain. August 13. Pantopon gr. 1/3 by mouth every six hours for today. Luminol gr. iss with veronal gr. v at 8 p. m. Russian oil with fluid extract of cascara ℥ iss 2 i.d. Luminol gr. iss. Nitroglycerin gr. 1/100 with pyramidon gr. v if he wakes. Give pantopon gr. 1/3 by mouth in half an hour if not asleep again.

The patient grew worse rather than better at first. By the 14th of July he had edema of the hands as well as of the legs. The temperature tended upward. July 19 there was redness and tenderness of the left great toe. A surgical consultant reported, "Subsiding inflammation, cause indefinite. Making satisfactory progress."

July 21 the patient suddenly complained of inability to breathe and became unconscious. He was relieved by nitroglycerin. That evening he seemed as usual. On the 23rd he complained a great deal of smothering and precordial pain, although the pulse was slightly better that night. July 28 the edema was returning to the hands and legs. He felt more comfortable after the abdominal tap of July 29, and the edema of the hands was much less.

The calomel therapy which was tried in an attempt to produce a diuresis was not followed by increased output. August 9, however, with an intake of less than fifty ounces the urinary output was sixty ounces. Symptomatically the patient was the same, the edema of the legs less. An electrocardiogram showed return to normal or only slightly abnormal (low origin of $T_2$) complexes. August 17 he had a good night, August 18 a bad one. He said that he did not wish to live, and seemed to try to make his condition worse by getting out of bed and walking about when not watched. This caused much cyanosis and orthopnea. By August 20 his sputum was almost pure blood. The edema and right hydrothorax were unchanged. During the visit he tried to get out of bed and fell against a table. The left ear and side of the head became very blue. Caffein and oxygen brought him out of orthopnea. He was given a quarter grain of morphia and was quiet the rest of the day. The extremities became rapidly blue. That afternoon he died.

## DISCUSSION

### BY DR. RICHARD C. CABOT

### NOTES ON THE HISTORY

We need to know more about this nycturia, whether it is habitual or has come on recently. He is at an age when it may, I suppose, be due to his prostate.

**Dr. Young:** He is pretty young. We do not expect a prostate to make trouble before sixty, although occasionally it happens between fifty-five and sixty.

**Dr. Cabot:** Then if this is not due to the prostate it is more likely to be due to kidney or heart trouble.

In this history we have the whole picture of cardiac or renal disease; starting with cough, which probably itself was a manifestation of passive congestion, we go on to dyspnea and precordial pain, then nycturia, then orthopnea, palpitation, congested liver, and finally edema, presumably in the peritoneal cavity as well as in the lungs.

### NOTES ON THE PHYSICAL EXAMINATION

The heart apparently is 18.5 cm. wide, which is a big heart.

The diagram shows the signs of pulmonary edema, very likely exaggerated by the condition of the liver.

We have two records of the low specific gravity of the urine, but no more. Hence we cannot generalize about it.

The orders were the regular things for a failing heart, not very successfully treated.

At the end of the first entry we may well sum up what we have so far and speculate as to what was the diagnosis in the first entry. It is a case where everything points in one direction, to the hypertensive type of cardiac trouble, with or without nephritis. The question of how much the kidney is involved is not yet clear. There is a rather high output of the coloring matter in the functional test, rather a low gravity, rather a large amount, and nycturia. The non-protein nitrogen is a little high but not much. On the whole, the evidence against any considerable destruction of kidney tissue seems to me a little better than the evidence that there is much destruction of kidney tissue. But the evidence is not good. We hope that at the second entry it will be better.

The history of the interval sounds very much as if he had a lung infarct and spit blood from it. Then we have some twitching, which is a new symptom, rather more like what we used to call uremia. But otherwise he goes along rather poorly through that period, without anything to make us change our diagnosis.

At the second examination we find that the kidney has power to concentrate urine fairly well. Now he seems to have some residual urine, although Dr. Young says he is too young for a prostate. We now know as much as we shall know about the urine, and I feel more strongly than I did before that while there is some change in the kidney it is not of the grade that we call nephritis.

They got an unusually large amount of fluid on chest tap.

There is a long list of orders, mostly digitalis and various things for pain, for catharsis or for diuresis. More diuretics were used this time than before, which means that they did not think there was much wrong with his kidneys.

**A Physician:** What was the calcium chloride for?

**Miss Painter:** That was for diuresis.

**Dr. Cabot:** I suppose his bundle branch block must have gone by this time, since they called the electrocardiogram normal.

### DIFFERENTIAL DIAGNOSIS

Hypertensive heart trouble, that is, heart trouble in which we have reason to believe that the hypertension comes first, the hypertrophy second, and anything else that may occur third, —the type described in H. Batty Shaw's book, *Hyperpiesia and Hyperpiesis*. It seems to me to be becoming increasingly clear that we can have hypertension without any arteriosclerosis or any kidney trouble, and that those things, while they have more effect when they come in, are in many cases not there at the beginning.

I have nothing to add to what I have said about the kidneys. I believe that they will not show nephritis. In such cases they usually show some arteriosclerotic foci. The rest of the organs should show passive congestion, and the lungs should show infarcts. And with infarcts in one set of organs there is a good chance that they will be found elsewhere.

The question about his coronaries is naturally raised by the pain which he has had. We have a good many cases of true angina without any coronary disease, and a good many with coronary disease. I do not see how we can say anything definite about it. The angina is not described as typical. He certainly does not have any of those long attacks with severe pain which we associate with a blocked coronary. Dr. White, is there anything you would add?

**Dr. Paul D. White:** The electrocardiograms were interesting. The first one taken showed bundle branch block or faulty conduction through the ventricles, which is usually found with coronary disease and rarely with other conditions. Coronary disease might have been a factor in producing heart failure along with the hypertension. In other words, there may be not only hypertension but also arteriosclerotic heart disease, supported somewhat by the electrocardiogram. The electrocardiogram became much more normal later on, and that is extraordinarily rare. It was not exactly normal however even on the second occasion. It may be that an additional lesion or defect in conduction in the left branch would neutralize the defect in the right, and so progressive heart disease may rarely bring about a more normal appearance of the electrocardiogram. Otherwise we should have to think that the local circulation in the region of the right bundle branch was improved although his general condition was going downhill. Whether the course of the disease can be explained solely on the basis of his hypertensive heart disease or whether there is coronary disease also we cannot be sure. Whether or not there is thrombosis I cannot say.

Dr. Richardson: If your first proposition is established, associating the condition with change in the coronaries, would the heart ever recover?

Dr. White: I have seen one other case like this in which there was temporary bundle branch block. There are temporary toxic effects producing intraventricular block from such things as quinidine, and one may have temporary bundle branch block in extreme tachycardia when the heart is fatigued. In one case I remember that in the middle of a spell of flutter with ventricular rate of 273 the right branch suddenly failed to conduct. This cleared up as soon as the ventricular rate came down. It was temporary intraventricular block. It is possible to have such toxic or fatigue effects, although they are very rare.

Dr. Cabot: When you say "coronary disease" I take it you mean not only disease in the coronary but considerable narrowing in the coronary, with or without block.

Dr. White: Yes; but I feel that in some cases angina pectoris may be due to early changes in the coronaries which would be hardly demonstrable post mortem. Slight changes which increase the liability for spasm in the vessel might not be found post mortem, and the stiffer the arterial tube the less likely it is to contract spasmodically, so that absolutely calcified coronaries may not give so much pain as the less damaged vessels.

Dr. Cabot: I was struck in going over records recently with the very large number of diseased coronary cases we have without any pain at all.

Dr. A. V. Bock: Would you consider this a fairly typical history for a case of hypertensive heart disease? It seems to me to have a history going back only six weeks before entrance, and he came in with a completely broken compensation and edema. I saw him on the second entry, and at that time was impressed with the amount of congestive failure he had, but with an organism in other ways in quite good condition. It seemed to me that there was practically nothing wrong with his kidneys and there was not enough clinically wrong with his heart, in size, etc., to account for the complete breakdown and his failure to respond. He had a lot of congestive failure for an ordinary case of vascular hypertension.

Dr. Cabot: That is, you would expect the history to be longer,—years rather than a few months? That was my opinion until I recently went over all our cases. The majority of them have been well until a few months before death. They did not have long histories. I have always taught that they did. I did not find out my mistake until I looked up that very point in our cases. The number of cases that extend over one year is small. Most of them have symptoms for less than six months. This sounds a little shorter than that, but not much shorter. But you saw him, and one often sees a good deal that does not get down in a record; it may well be that you will turn out right, that there is something else besides what we can infer from the record, but I cannot think what it is.

Dr. White: Did those cases show coronary disease?

Dr. Cabot: I do not think I looked at them from that point of view.

Dr. White: In a case of chronic hypertension coronary disease might precipitate failure.

Dr. Cabot: I am sure they did not have coronary thrombosis, most of them. But I do not remember now how many of them had coronary disease. Certainly, as Dr. White has pointed out, there is a good possibility of another element besides pure congestive failure here on the basis of coronary disease. But on what we know here I do not feel sure of it.

Dr. Bock: Do you know in what percentage of cases the patients die this way, as compared with cerebral hemorrhage and pneumonia?

Dr. Cabot: Cases of death from cardiac failure are in the minority. Cardiac failure is as frequent as any other single cause of death. But adding up deaths from terminal infections and from cerebral hemorrhage and deaths after surgical operations, these three together are more numerous than this congestive group. The group who die with congestive failure and nothing else makes up about one-third of all cases.

Dr. Bock: There never seems to be enough in the pathology of the heart to account for death.

Dr. Cabot: There never does, so far as I see. That is the mystery we are looking for light on. We see at necropsy a big heart, but no bigger than in a great many people who do not die this way. That is, I do not think we have got at the cause of death, but I do not know any more to say.

Dr. Robbins: In regard to the calcium chlorid, I was asked to try it. I cannot see any justification for it. It is a nasty drink, and where a man has a weak stomach that one is trying to coax along why give him stuff that would knock a healthy man out?

### CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

**Arteriosclerotic and hypertensive heart disease.**
**General arteriosclerosis.**
**Arteriosclerosis of the coronary arteries.**

### DR. RICHARD C. CABOT'S DIAGNOSIS

Hypertensive heart disease.
Hypertrophy and dilatation of the heart.
Arteriosclerosis.
Infarcts of the lungs, etc.
Chronic passive congestion.

### ANATOMICAL DIAGNOSIS

1. *Primary fatal lesions*

Slight arteriosclerosis.
Hypertrophy and dilatation of the heart.
Fibrous myocarditis.
Mural thrombi in the left and right ventricles and in the right auricle.
Embolic thrombosis of visceral branches of the pulmonary artery.

2. *Secondary or terminal lesions*

Infarcts of the lungs.
Chronic passive congestion, general.
Hydrothorax, right.
Ascites.
Anasarca.
Infarcts of the left kidney.

3. *Historical landmarks*

Slight chronic pleuritis.
Very slightly defective closure of the foramen ovale.

Dr. Richardson: We were not permitted to examine the head. The body generally looked as though weight had been lost. The hands were puffy, and the lower extremities were swollen and pitted on pressure. There was a fair amount of subcutaneous fat. The subcutaneous tissues were wet,—anasarca.

The peritoneal cavity contained 700 c.c. of thin pale clear fluid, ascites. The gastro-intestinal tract showed a velvety reddened mucosa oozing thin bloody fluid,—chronic passive congestion.

The diaphragm on the right was at the sixth rib, on the left at the sixth interspace. That is considerably lower on each side than usual.

In the right pleural cavity was about 1500 c.c. of thin fairly clear fluid, in the left a few c.c. of similar fluid,—marked hydrothorax on the right, none on the left. There were a few scattered pleural adhesions, none at the apices. The trachea and bronchi contained much bloody frothy fluid and mucus. The lung tissue showed chronic passive congestion and many infarcts. The sum total of these infarcts in the right lung involved at least one-third of the lung. That is pretty extensive. The left lung showed several infarcts, but not so many and not involving so much of the lung.

There was 75 c.c. of fluid in the pericardium. The heart weighed 706 grams,—marked hypertrophy. The valves were negative. The myocardium was generally negative; but in the region of the apex there were areas of fibrous myocarditis, and there were mural thrombi in this region. Along the intraventricular septum there were mural thrombi as well as in the right ventricle and in the right auricle. The coronary arteries were in good condition as far as we could dissect them. The cavities on the left side showed considerable dilatation, and on the right marked dilatation. A hypertrophied and dilated heart with a few changes in the myocardium of the apex of the left ventricle, slight myocarditis and mural thrombi.

The aorta and great branches showed only a slight amount of arteriosclerosis. The pulmonary artery and primary branches were negative, but many of the branches within the lung were occluded by embolic thrombi, coming of course from the mural thrombus in the right auricle or bits from the one in the right ventricle—two sources.

The liver weighed 2685 grams, moderately enlarged, and showed chronic passive congestion. The spleen weighed 373 grams, slightly enlarged, with a few old adhesions. The tissue showed chronic passive congestion.

The kidneys weighed 481 grams, large. There were infarcts in the left. Infarcts and chronic passive congestion.

A case then where the amount of hypertrophy and dilatation of the heart is not warranted by the anatomical bases found,—the so-called idiopathic hypertrophy.

Dr. Cabot: This is interesting then as a case of hypertrophy and dilatation and hypertension without any of the causes that we used to think necessary, without any considerable arteriosclerosis, without any nephritis at all.

I should like to know what any of those here present would say as to the causes of heart failure in this case now that we know the outcome. Should we say, do you think, that he had two elements causing heart failure?

Dr. White: It may be that a vicious circle was started. He had a good deal of infarction and it may be that the temporary bundle branch block may have been due to a small infarct, the right branch blood vessel having been infarcted and the circulation having been restored at the time he came back for the second visit. The intracardiac thrombosis may have resulted from the slowing of the circulation due to the heart weakness, probably in turn due to the chronic hypertension. The infarction may have been a contributing factor however in the production of the heart failure.

Dr. Cabot: So that you think we should say there are two elements here, first hypertrophy and dilatation and second the element of infarction.

## CASE 10482

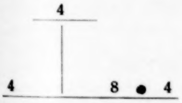
A colored laborer of twenty-one entered June 2 *in extremis.* The complaint was dsypnea of two months' duration. The history was obtained from a cousin.

F. H. His mother and two brothers died of heart trouble (rheumatic?).

P. H. He had rheumatic fever at six years. Ever since that time he had had frequent colds with cough and possibly sore throat. At sixteen his face and eye were burned with acid. His bowels were very constipated. He had always been thin.

P. I. Two months before admission he caught a severe cold with cough. Since that time he had not been out of the house, though he had been up and about the room daily. His principal symptom had been orthopnea. He spent every night in a rocking chair. He maintained some strength until three weeks before admission. Then the ascending edema, now so marked, commenced. He had grown much weaker. He had been forced to sit quite upright. The dyspnea had been most painful. For three weeks he had been having digitalis four minims on an average of twice a day.

P. E. A well nourished man in very apparent distress and marked dyspnea, too ill for complete examination. Numerous scars on face and forehead, with traumatic ectropion of the left upper lid, due apparently to scar tissue contraction. *Heart* enlarged. Percussion measurements as shown in the diagram. Action absolutely irregular. Sounds replaced by systolic and diastolic murmurs at the apex, with diastolic thrill. At the aortic area a harsh systolic murmur transmitted upward, and a short diastolic whiff. ***B. P.*** 140/55. ***Lungs*** clear in front. Fine and medium crepitant râles at the bases, with slight dullness. ***Abdomen*** tense. Very dull in the flanks. Tympanitic in midline. Transmitted fluid wave. Shifting dullness. Palpation impossible. ***Genitals*** and ***extremities*** markedly edematous. Legs very swollen from the hip down. Scrotum and penis tense and hugely swollen, pitting.



*T.* not recorded. *P.* 85. *R.* 37. ***Urine*** not recorded. ***Blood.*** Hgb. 75%, leucocytes 22,400, polynuclears 86%, many basket cells. Reds and platelets normal.

*Orders.* June 2. Karell diet. Digitalis gr. vi at once, gr. iii at midnight and 7 a. m. Morphia gr. 1/6 s.c., repeat in two hours. Limit fluids to 1500 c.c. Caffein sodium salicylate gr. viii intramuscularly. Digifolin 4 ampules.

A genito-urinary consultant advised only scrotal support and expectant treatment for edema. Abdominal paracentesis was done, as it was felt that the respiration was further embarrassed by the large amount of fluid in the abdomen. Only a few cubic centimeters of straw-colored opalescent fluid was obtained, however. It was felt there was surely much fluid left. That evening by advice of a heart consultant intramuscular digifolin gr. vi was given in addition to six grains of digitalis, already given. When the patient was seen at 10:15 the pulse was about 90 and of fairly good volume, the respirations were rather rapid and shallow. At 11 o'clock he died.

### Discussion

BY DR. MAURICE FREMONT-SMITH

#### NOTES ON THE HISTORY

The fact that his mother and two brothers had died of heart trouble is interesting in the light of St. Lawrence's work on The Familial Incidence of Rheumatic Heart Disease. In a rather large group of cases St. Lawrence found that there was more rheumatic fever in the families of those children who had rheumatic fever than there was tuberculosis in the families of a similar group of tuberculosis cases studied. It brings up the question as to whether rheumatic fever may be a directly communicable disease from child to child.

Whether to take out the tonsils of a child who has had rheumatic fever is always a question. St. Lawrence feels that the chances of a second attack are lessened if the tonsils are taken out. Especially is this true if there is evidence of the infection of the tonsils, and very definitely if there is increase in size of the tonsillar glands. A recent report from Guy's Hospital however shows that the occurrence of repeated attacks was as high or higher in a group in which the tonsils were taken out as in another group in which they were not.

We have a pretty clear picture of a young man who had in childhood an attack of rheumatic fever evidently with cardiac damage, a mitral stenosis, and here at the age of twenty-one shows the signs of marked cardiac failure. It is interesting that the complaint of dyspnea was noted only two months previous to the time that he came in to the hospital *in extremis.* It is unusual to have dyspnea noted only two months before the man comes in with complete cardiac failure. The cause of dyspnea in heart disease is not entirely settled. Peabody has called attention to the close association between the vital capacity and the function of the heart. He finds in the same individual that the vital capacity,—that is the amount of air that can be expired after a forced intake,—runs very parallel with the cardiac function. As the heart function decreases the vital capacity decreases. The vital capacity is decreased of course wherever the ability of the lungs to expand is interfered with. So that a very large heart itself, by taking up chest room, will decrease the vital capacity. Fluid in the pleural cavity, a large liver, or ascites will also do the same. But dyspnea in cardiac disease appears very much earlier than any of these marked mechanical causes, and the question is, why is the cardiac dyspneic so early? One answer is that especially in mitral disease, where dyspnea comes on earlier than in any other form of heart disease, the congestion of all the small vessels of the alveoli due to the increased pressure in the pulmonary circuit decreases the elasticity of the lungs so that when the chest wall expands the lung is unable completely to follow it, and consequently less air is breathed in.

Four grains of digitalis twice a day is an exceedingly large dose. Usually we give six grains a day for three days, or possibly four in a large man, and then run along at 1½ to 3 grains a day.

**Miss Painter**: That should be minims.

**Dr. Fremont-Smith**: That cannot be right, for four minims a day would be no dose at all. That would be half a grain.

**Dr. Robbins**: I think that is probably what it was. We see that very commonly, that people expect to get results with a small dose of that kind continued day after day. We really get nothing from it at all.

**Dr. Fremont-Smith**: He was really getting eight drops twice a day, which is less than four minims, that is less than half a grain a day.

### NOTES ON THE PHYSICAL EXAMINATION

In other words a very badly damaged rheumatic heart, mitral stenosis, aortic regurgitation, and muscle injury.

Of course the urine in this case would have shown the evidence of chronic passive congestion,—a large trace of albumin, many fine granular casts and many red cells.

When a cardiac comes to this state of decompensation there is always an increase in the leucocyte count, probably without infection. Of course there may have been some infection in the lungs as well. It would have been interesting to know what his red count was. A man as dyspneic as this probably would have shown definite polycythemia.

**Miss Painter**: It was 5,200,000. There is a note, "very cyanotic."

**Dr. Fremont-Smith**: Of course it is hard to get the hemoglobin reading in a cyanotic man, because there is a great deal of reduced hemoglobin. Normally the hemoglobin in the blood is oxyhemoglobin.

Karell diet is a glass of milk four times a day and nothing else. That diet of course gives a certain amount of nourishment and reduces the fluid intake to a low level, which is necessary if we are to try to get rid of edema.

In other words they gave him twelve grains of digitalis as quickly as they could, twenty grains probably being about his full digitalis dose. Morphia is really more important than the digitalis at the moment. Whether the caffein sodium salicylate can be of any value in such a situation I doubt very much.

The only chance was to stimulate the heart muscle to do its best work as quickly as possible. The man was evidently dying.

### DIFFERENTIAL DIAGNOSIS

I do not think there is any differential diagnosis here. I think we shall find a large heart with myocarditis, mitral stenosis, aortic regurgitation, possibly an adherent pericardium, chronic passive congestion in all the organs and ascites.

**A Physician**: How long does it take to get under the influence of digitalis by mouth?

**Dr. Fremont-Smith**: After a large dose of digitalis the effects should be evident in three or four hours, giving the dry leaf.

### CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Rheumatic heart disease. Aortic and mitral stenosis and regurgitation.
Congestive failure.
Anasarca.

### DR. MAURICE FREMONT-SMITH'S DIAGNOSIS

Chronic endocarditis; mitral stenosis.
Aortic regurgitation.
Myocarditis.
Hypertrophy and dilatation of the heart.
Chronic passive congestion.
Ascites.
Chronic pericarditis?

### ANATOMICAL DIAGNOSIS

1. *Primary fatal lesion*

Chronic endocarditis of the mitral, aortic and tricuspid valves, stenosis.
Fibrous myocarditis.

2. *Secondary or terminal lesions*

Hypertrophy and dilatation of the heart.
Chronic passive congestion, general.
Hydropericardium.
Hydrothorax.
Ascites.
Anasarca.
Infarct of the right kidney.

**Dr. Richardson**: The head was not examined. The body and extremities were markedly swollen and pitted on pressure. The penis and scrotum were swollen. There was a tap wound just below the umbilicus.

The abdomen was slightly distended, the wall rather tense. The subcutaneous fat was small in amount. The subcutaneous tissues were wet. The peritoneal cavity contained 2000 c.c. of clear pale fluid,—ascites. The stomach and intestines showed well marked chronic passive congestion, that is, dark red thick, velvety mucosae oozing thin bloody fluid.

No sign of tuberculosis was found anywhere.

The liver was twelve cm. below the costal border. The diaphragm on the right was at the sixth rib, on the left at the sixth interspace,—both down.

The right pleural cavity was two-thirds full of pale clear fluid, the right one-third. The lung tissue showed well marked chronic passive congestion.

The pericardium contained 300 c.c. of pale clear fluid, a slight hydrothorax. The heart weighed 920 grams, a very unusual weight—marked hypertrophy. The myocardium generally was thick, the right side seven to eight mm., the left fifteen mm. The cavities were much dilated on the left, both ventricle and auricle. On the right side there was slight dilatation of the right ventricle and much dilatation of the auricle. The walls of the auricles were thickened. The mitral, aortic and tricuspid valves were all affected in this case. They showed marked chronic fibrous endocarditis with a few small areas of calcareous change. The fibrosis extended from the region of the posterior cusp of the mitral valve up on the auricle, an extension common in these cases. The aortic and tricuspid valves showed frank chronic fibrous endocarditis.

The liver showed typical markings of chronic passive congestion. The duct of Wirsung was not made out. The spleen showed chronic passive congestion. The kidneys weighed 475 grams and showed chronic passive congestion. In the right kidney there was a small old infarct, evidence of course that *x* years ago there was an acute endocarditis from which a bit washed off, producing this infarct. It is strange to have so much change in the valves and so little infarction.

Microscopic examination of the myocardium showed a few small areas of fibrous change, i. e., replacement ~~of the~~ muscle tissue by fibrous tissue,—true myocarditis.

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## CASE 10483

An Irish-American clerk of sixty-three entered July 21 for relief of complete retention.

F. H. The father and one child of the patient died of heart disease, one brother of cancer. One brother had diabetes. One sister was in an insane asylum. His wife had had one miscarriage.

P. H. He had smallpox at eleven, possibly gonorrhea at thirty-three. At times he had shooting pains from the left shoulder to the wrist. He thought these due to the way he carried a mail bag. He had slightly increasing difficulty in moving his bowels.

P. I. Nine years before admission he had an attack of spontaneous total hematuria with varying amounts of blood in the urine for a week or ten days. Six years later he had blood in the urine once. Two years ago he began to have burning micturition, the urinary stream was slow in starting and flowed less freely than formerly, and he had moderate frequency and urinated two or three times at night. These symptoms had continued unchanged. The difficulty in urination had constantly increased so that he had been having to immerse the penis in hot water to start the stream. He thought his bowels seemed obstructed from a mass in the rectum. He had been gaining weight. The night before admission he had total retention. A physician tried to catheterize him, but met with an obstruction and found tissue on the end of the catheter which he said might be new growth. In the Emergency Ward a filiform was passed and water drawn by a follower.

P. E. Well nourished. Arteries tortuous and sclerotic. Teeth poor. Marked pyorrhea. A small lipoma near the angle of the right scapula. *Lungs* negative except for slight crackles at the right base. Apex impulse of the *heart* diffuse and powerful in the normal position. First sound at the apex booming. Absolute irregularity in force and rhythm. An occasional apex beat dropped in the radial pulse. No murmur. $P_2$ equal to $A_2$ but not accentuated. *B. P.* 170/90. *Abdomen* negative. *Rectal examination.* Prostate markedly enlarged, smooth and elastic, not fixed.

Until the afternoon of July 23 *T.* 97.3°-99.7°, *P.* 58-78, *R.* normal; that afternoon *T.* 102.5°, *P.* 105, *R.* 43. Before operation *urine* cloudy, alkaline, sp. gr. 1.012, the slightest possible trace of albumin, *non-protein nitrogen* 30 mgm., *blood* not recorded, *Wassermann* negative, *renal function*, appearance time 6 minutes, in two hours 27%.

*Orders.* House diet. Force fluids. Urotropin and acid sodium phosphate each grains x 4 i.d. Luminol gr. iss, repeat once if necessary. Liquid petrolatum ℥ i 2 i.d. July 22. Codeia gr. iss every three hours p.r.n. July 23. $MgSO_4$ ℥ i. Codeia gr. iss every three hours p.r.n. July 25. Two compound cathartic pills. July 27. Deodorized tincture of opium 10 drops every three hours p.r.n. July 28. Digitalis leaves gr. iss 2 i.d. August 8. Whiskey ℥ ss. August 10, 11, 12, and 16. Cocain 1% 20 minims by mouth. August 16. Morphia gr ¼.

There was gradual decompression after the introduction of the filiform and follower. July 23 the catheter came out. A self-retaining catheter could not be put in place because of the large prostate. The urethra was very painful.

July 24 operation was done. After it the patient had a temperature of 102.6°, excessive sweating, and weak pulse. He improved after a subpectoral. The next morning he vomited small amounts, but retained fluids. The temperature came down slowly. The general condition however was poor and the local condition uncomfortable. July 26 the heart sounds were perfectly regular. There was a questionable slight systolic murmur at the apex and along the left border of the sternum. By the 29th he was more comfortable and up in a chair. August 1 the non-protein nitrogen was 27 mgm. per 100 c.c., the renal function 35% in two hours. August 4 the stitches were out. He complained of much pain in the penis.

August 5 a second operation was done. He was so very uncomfortable from the Hagner bag that it had to be removed. He vomited. Two subpectorals were given. The following day he could retain water, his tongue was moist and his temperature somewhat lower. That evening he complained of a good deal of pain in the right ankle joint, which was extremely tender on motion. He had much hiccup at intervals. August 8 the ankle was swollen, hot and reddened. A posterior angular splint gave little relief. He hiccupped all day and was very uncomfortable. The non-protein nitrogen was 30 mgm. August 9 an operation was done on the ankle, affording marked relief.

August 10 the temperature suddenly rose to 104°, the respirations to 50, and the pulse to 108. The next day the chart was falling. The hiccup was relieved by sitting up in a wheel chair. The general condition was much improved, although the ankle continued to be very painful. August 12 culture from the fluid from the right ankle showed streptococci. The evening of the 12th the temperature rose again to 102° and there was pain in the left shoulder. By August 14 the left arm was edematous, the shoulder still painful. A small bedsore was developing over the sacrum, and the septic ankle did not drain well. It was probed, with the liberation of a small amount of bloody pus. The edema in the arm subsided slightly when he raised the arm, but reappeared when his arm was at his side. August 15 a blood culture was negative. The evening of the 16th he was semicomatose at times. The tube was obstructed, and much blood drained by urethra. A small blood vessel in the upper part of the incision started to bleed and soaked the dressing. August 18 there was a small swelling at the inner end of the clavicle over the spot where he complained of pain. That day he died.

## DISCUSSION

### BY DR. EDWARD L. YOUNG, JR.

With complete retention at sixty-three we always think of an obstructing prostate; every now and then we find a stricture instead.

**DR. CABOT:** What is a "follower"?

**DR. YOUNG:** A larger bougie or metal sound which screws on the filiform; the filiform serves as a guide to let it in.

Hematuria three years before would almost surely rule out malignant disease, especially when it is noted that he is gaining weight. It would almost rule out papilloma, because papilloma growing all that time would generally give a good deal more hematuria and obstruction. Hematuria from a stone or infection likewise would give other symptoms. Hematuria from an obstructed prostate might have occurred years before and have repeated itself as this has, and yet obstruction from the prostate not have gone on to complete retention until this time. Hematuria from a stricture probably would not have occurred nine years before and the stricture not have shut down before this.

**A PHYSICIAN:** Can there be such an amount of hematuria from a prostate?

**DR. YOUNG:** Yes. It is quite a good deal to have a "total hematuria" for a week or ten days, but it can occur. Also, of course, we cannot absolutely rule out hypernephroma. There have been cases on record for this time, but the chances are against it. The significance of the fact that tissue was found on the end of the catheter depends on what kind of catheter was used and how much force. A prostate can cause obstruction either by the pressure of the lobes on the urethra, making it very difficult to pass anything, or at the bladder neck by actual stricture from fibrous contraction.

If he has one of these conditions, i. e., stricture or prostate, he presumably has not got the other. That was worked out here several years ago by Dr. G. G. Smith, who found that practically never do the two conditions exist together. Apparently the reason is that inflammation enough to cause a stricture will generally result in fibrous tissue in the prostate which will prevent the development of an adenoma.

The renal function was somewhat down, but a very good function.

In this examination the rectal feel of the prostate suggests that the trouble is an adenomatous prostate. The patient mentioned feeling that there was something in the rectum making trouble when his bowel moved. It is true occasionally that rectal enlargement of the prostate is enough to make the patients conscious of it.

The bladder had been over full. There was back pressure on the kidneys interfering with their work, and the decompression went on after the introduction of the filiform and follower.

They did a cystostomy. At least I suppose that was the operation. In the minds of a good many men the relief of back pressure is much more efficiently done by it than with a catheter because, as some one has suggested, in cutting the muscles of the bladder wall the sphincter action of the ureters is destroyed so that the kidneys are more directly released from the pressure.

### DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Obstructing prostate.

### PRE-OPERATIVE DIAGNOSIS JULY 24

Obstructing prostate with acute retention of urine.

### FIRST OPERATION

Local novocain. Midline incision over bladder. Bladder opened and rubber drain stitched in. Wound closed in layers.

### FURTHER DISCUSSION

Sometimes these cases will seem to be much worse clinically than the laboratory tests suggest. Then there are other factors—the cardiac condition as suggested here—which make a difference. In this case twelve days were allowed to elapse for decompression. There is always the question how long we are going to let the patient go with a suprapubic fistula. The mental condition of the patient is sometimes very important. To some patients the drainage makes no difference. Others are so bothered that it is almost in the same class as psychic shock after local anesthesia, and with them when it is a question of doubt it is generally wiser to go ahead a little early. So far as his apparent condition on paper is concerned, he is certainly ready for the second operation. Twelve days is a fair interval. The man who saw him is a better judge than we are.

I assume the second operation was a prostatectomy, done under ether or spinal gas-oxygen.

### DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Obstructing prostate.

### PRE-OPERATIVE DIAGNOSIS AUGUST 5

Obstructing prostate, benign.

### SECOND OPERATION

Spinal novocain was given, but imperfect anesthesia resulted. Very light gas and ether were given for the few minutes necessary to enucleate the prostate. The wound was then sutured without further anesthesia. The prostate was very large, with mid and lateral lobes. It was removed in one piece with little bleeding. A Hagner bag was placed for controlling the bleeding. The patient was given a subpectoral and sent to the ward in good condition.

### PATHOLOGICAL REPORT

Microscopic examination showed adenomatous hypertrophy.

### FURTHER DISCUSSION

The Hagner bag is the greatest invention I know of to give the surgeon a night's sleep without worry, but it is a most painful thing for the patient. It is less dangerous than packing with gauze which has to be pulled out; it has a smooth surface and does not pull the wound to pieces when it comes out the next day. The record does not say when the Hagner bag was removed. They are always deflated and removed the next morning and can generally be deflated the same night, although generally not removed.

**MISS PAINTER:** There is an entry, "it is to be removed at two P. M."

**DR. YOUNG:** So that it was only in a matter of three or four hours.

Then followed a metastatic sepsis. In these exercises I have seen two or three cases where there was streptococcus infection which, while there was no proof, seemed to have come from an infection in the first stage wound. Of course we are operating through a wound which inevitably has bacteria in it. Whether this is another one of those cases I do not know. I presume that the third operation was incision and drainage of a septic ankle.

### DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Septic right ankle.

### PRE-OPERATIVE DIAGNOSIS AUGUST 9

Septic right ankle.

### THIRD OPERATION

Gas-oxygen. Two V-shaped incisions were made each just anterior to the malleolus. The ankle joint was opened and a large amount of pus obtained. The wound was left wide open. Dressing applied.

### FURTHER DISCUSSION

All I can see to add is streptococcus infection with the evidence of the metastatic processes. I do not know whether it will be possible to say where that started. So far as the operation itself is concerned I do not see that there is anything to add. He died of course as a result of operation, but more as an accident than from anything wrong in judgment or technique.

I think the interest is to see whether Dr. Richardson can help us out on the question of the site of the infection. This I think is the third case we have had of a streptococcus infection following a two-stage operation—just enough so that I wonder whether it came from a stirring up of streptococci in the wound itself.

### CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Suprapubic cystotomy and prostatectomy.
Adenomatous hypertrophy of the prostate.
Sepsis.

Advanced arteriosclerosis.
Incision and drainage abscess of right ankle.

### DR. EDWARD L. YOUNG'S DIAGNOSIS

Adenomatous obstructing prostate.
Streptococcus septicemia.

### ANATOMICAL DIAGNOSIS

1. *Primary fatal lesion*

(Adenomatous obstructing prostate.)

2. *Secondary or terminal lesions*

Suprapubic prostatectomy.
Hemorrhage into the bladder.
Anemia.
Edema of the lungs.
Septicemia, streptococcus hemolyticus.
Abscesses of right ankle joint and left sterno-clavicular joint.
Soft hyperplastic spleen.

3. *Historical landmarks*

Lipofibroma of the right kidney.
Slight arteriosclerosis.
Slight hypertrophy and dilatation of the heart.
Slightly defective closure of the foramen ovale.

Dr. Richardson: A very large, muscular man. We were not permitted to examine the head. The skin and mucous membranes were pale.

In the base of the operation wound there was a large blood clot. The bladder contained at least 360 grams of blood clot and some fluid blood. The prostate was wanting and the shell of tissue remaining showed a roughened irregular inner surface infiltrated with blood and blood clot.

On the left side in the region of the sterno-clavicular joint there was pus. Cover-glass from the pus showed streptococci and leucocytes.

Culture from the blood at necropsy showed a septicemia, streptococcus hemolyticus.

The gastro-intestinal tract was out of the picture. The walls of the intestines were very pale.

Each pleural cavity contained 400 c.c. of thin pale fluid.

The tissue showed considerable edema which was rather bloody in the region of the lower lobes, the edema which is usually associated with streptococcus hemolyticus infections.

The heart showed slight hypertrophy and dilatation, but the valves, coronary arteries and myocardium were frankly negative.

The aorta showed a slight amount of arteriosclerosis scattered along its course.

The kidneys were rather large. All the organs were large. The kidney tissue was negative. There was a small lipofibroma in the right kidney.

Dr. Young: You have no help as to where the infection came from?

Dr. Richardson: Clinically he had a rise in temperature, didn't he? When did the ankle first appear?

Dr. Young: After the second operation—the same day.

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## CURRENT LITERATURE

### ABSTRACTORS

**Gerardo M. Balboni**
**William B. Breed**
**Laurence D. Chapin**
**Austin W. Cheever**
**Randall Clifford**
**Ernest M. Daland**
**Horace Gray**
**Robert M. Green**
**John B. Hawes, 2nd**
**John S. Hodgson**
**Fred S. Hopkins**
**Chester M. Jones**
**Charles D. Lawrence**
**Tracy Mallory**
**Herman A. Osgood**
**Francis W. Palfrey**
**Edward H. Risley**
**George C. Shattuck**
**William H. Shedden**
**Warren R. Sisson**
**John B. Swift, Jr.**
**George G. Smith**
**W. T. Sherman Thorndike**
**Wilder Tileston**
**Henry R. Viets**
**Shields Warren**
**Bryant D. Wetherell**

### Cervical Sympathectomy for the Relief of Pain

**Smith, F. J., and McClure, R. D.** (***Surgery, Gynecology and Obstetrics,*** **August, 1924**).

**These authors report on two cases treated surgically for angina pectoris and draw the following conclusions:**

**"While in many cases resection of the cervical sympathetic in angina pectoris, unilateral or bilateral, may greatly lessen the number and minimize the intensity of the painful attacks, it must not be counted on to secure complete relief from pain unless the first thoracic ganglion is included in the resection.**

**"The resection should be done first on the side which has shown the greatest or most severe radiation of pain, and followed later by a similar operation on the other side, if complete relief is not obtained after the first one.**

**"As has already been pointed out by Jonnesco, more favorable results may be expected in those individuals in whom the painful attacks dominate the picture, while the cardiac compensation is good, than in the patients who give evidence of grave heart muscle damage or are already in a state of cardiac failure.**

**"The main indications for operation are:**

**"1. Frequent and severe attacks necessitating the giving up of occupation, and not yielding satisfactorily to medical measures.**

**"2. A feeling on the part of the patient that the painful attacks provide an intolerable situation."**

**[E. H. R.]**

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### Suboccipital Puncture in Epidemic Meningitis

**Hartwich, from Volhard's medical clinic at Halle, reports (*Münch. med. Woch.*, July 11, 1924) his experience, in two cases of epidemic meningitis, with suboccipital puncture of the cerebello-medullary cisterna and injection of meningococcus serum. He believes this procedure technically easier and less distressing to the patient than lumbar puncture. He thinks it would also be useful in local, otogenous meningitis, to prevent spread of infection.**

**[R. M. G.]**

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## TESTICULAR TRANSPLANTATION

"REJUVENATION" by means of ligation of the vas deferens or by testicular implantation, brought to the attention of the public by the daily press, has become a by-word and a jest. Conservative medical men (the best, as a rule, are conservative) have preserved an austere silence upon this subject, and our esteemed national journal—the *Journal of the American Medical Association*—saw fit to publish an editorial warning us of the futility of expecting any permanent result from testicular transplantation. (July 8, 1922.) The same journal in a later issue (Aug. 11, 1923, p. 479) commented unfavorably upon Steinach's experiments. Macht and Teagarden (J. Urol. Nov. 1923) have published the results of vasoligation in rats, but aside from that very little has been written in this country upon this subject.

The theory of "rejuvenation" by means of Steinach's operation, which is essentially a partial vasectomy, has very little to recommend it. Oslund, (Science—Vol. LX, No. 1558, Nov. 7, 1924, p. 421) who has carried out vasectomy on dogs, rats and guinea-pigs, maintains that vasoligation may cause atrophy of the seminal tubules when performed on rodents, because in this class of animals the inguinal canal is patent and the testis is free to pass into the abdominal cavity. After operation it may become adherent there, and then assumes the characteristics of a cryptorchid. From a detailed review of the literature Oslund has concluded (Am. J. Physiol. 1924—Vol. LXX, p. 111) that in animals having a closed inguinal canal, including man, vasectomy has produced no testicular changes. Since Steinach's theory of rejuvenescence is based on alleged atrophy of the seminiferous tubules and resulting hypertrophy of the interstitial tissue, the work of Oslund throws an atmosphere of doubt about the accuracy of Steinach's observations, in spite of the apparent clinical success which has been achieved in certain cases.

Within a few months Thorek, of Chicago, has published a book upon The Human Testis and its Diseases* in which the literature relating to testicular function and transplantation has been summarized in sufficient detail that one may get a clear idea of the experimental evidence upon which the theory of transplantation rests. Steinach of Vienna, Knud Sand of Copenhagen, and Voronoff and Retterer of Paris have been the leading investigators in this field. Apparently certain theories have been substantiated and may be regarded as facts. Other hypotheses are based less on fact, more on fancy, and one must exercise his discretion in accepting them. It has been definitely proved that the testis consists of two sorts of cells—those which have to do with spermatogenesis, (the cells within the tubules) and the intertubular cells, or interstitial cells described by Leydig, which elaborate an internal secretion, which to a large degree governs the development of the secondary sex characteristics. The activity of the interstitial cells is very clearly related to the activity of various other glands of internal secretion, notably the suprarenals and the pituitary gland.

The ovary also contains interstitial cells which perform a similar function in the female. It is a function of both male and female gland to inhibit the development of those characteristics peculiar to the opposite sex, and to promote the development of the characteristics of the appropriate sex.

The result of abnormal activity of the interstitial cells may be seen in cases of eunuchoidism, retarded or precocious puberty, and Fröhlich's disease. In many of these conditions, other endocrine glands also function abnormally, resulting in a distinctly unbalanced condition of the internal secretions. It has been asserted that homosexuality and dementia praecox are often accompanied by demonstrable changes in the character of the interstitial tissue of the testes.†

That the major part of the above contentions are true has been proved by the well-known phenomena attendant upon castration, and by the experiments carried out by Steinach and by

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*Reviewed in this issue of the Journal.
†Steinach. Quoted by Thorek, p. 263.
Mott, F. W.: Proc. Royal Soc. Med., xiii, No. 8, 1920, pp.25-63.

Sand. These observers, working separately, have shown that the implantation of testes of rats in castrated females will be followed by the development of male characteristics, and vice versa. They have even implanted an ovary within a testicle, thereby causing the development in the animal of bisexual traits.

The technic of testicular transplantation has passed through various phases. That of Voronoff consists in dividing the testicle to be implanted into four longitudinal sections. The tunica albuginea of each is scored to admit of vascularization. Each portion is then fastened in position between the tunica vaginalis and the delicate cellular layer which overlies it. Thorek on the other hand advocates the deposition of the entire testicle, minus the epididymis and with holes cut in the tunica albuginea, in the retrorenal space. There it is protected from pressure, and as has been shown by necropsies on monkeys so treated, the graft becomes vascularized from the lumbar vessels. Microscopic studies of numerous grafts made six months or a year after the transplantation show destruction of the spermatogenic portion of the graft. The tubules have metamorphosed into a reticulated structure in the space of which are Leydig's cells.

The practical application of these theories has been carried out in animals in a most convincing way by Voronoff and Retterer, at the College of France. Only a few of their achievements can be mentioned here, but examination of the monograph by Serge Voronoff—"Greffe Animale"—will prove the feasibility of testicular transplantation. A number of the cases cited are illustrated by photographs which show the changes produced. For example, young castrated bucks and lambs were subjected to testicular transplantation. They developed all of the secondary male characteristics and were quite different from the castrated controls. In old rams and bulls who had long ceased to perform their sexual functions Voronoff implanted the testes of young animals. Within a few months these decrepit old animals regained their coat, their flesh and their sexual vigor. One ram, so treated at the age of 12 years, at 18 years was still vigorous. When 17 years of age be begot a healthy lamb.

Voronoff believes that by means of testicular grafting great advances may be made in the development of strains of animals which will yield more wool or more meat. Valuable bulls and stallions may have their period of sexual vigor prolonged. Voronoff points out, however, that there is a stage in senescence after which transplantation cannot avail.

The application of these principles to man is a much more complex problem. Old age in man is usually accompanied by many of the tracings of time which obviously cannot be erased; the supply of fresh gonadal secretion cannot offset the effects of organic changes in the vital organs. Glands suitable for use are difficult to obtain. Thorek, by means of blood tests, has found that only 2 or 3 kinds of apes are of sufficient consanguinity to serve as donors.

Like any new operation, testicular transplantation will have to pass first through a period in which it will be desired by the neurotic and the overstimulated. In many such cases its results will probably be unsuccessful. Its employment will be checked, fortunately, by the difficulty in obtaining material for transplantation. Later on, it will be adopted by the more conservative surgeons as a legitimate means of therapeusis in certain well-defined types of cases. Just what these will be, can only be learned by experience. In the animal industry, as predicted by Voronoff, testicular grafting may become of very great importance.

At any rate, a new chapter in surgery and physiology is being written. It will be surprising if, from this most interesting field of experimentation, something of value is not obtained for mankind.

◆

## CORRESPONDENCE

### A CRITICISM OF A BOOK REVIEW

October 17, 1924.

*Mr. Editor:*

What is a "book review"? Is it an unbiased analysis of an author's main thesis, or is it simply an opportunity for the reviewer to present his personal prejudices and predilections?

These questions are prompted by the treatment accorded a book in your issue of the BOSTON M. & S. JOURNAL for October 9. I have not read this book ("Psycho-Analysts Analyzed"); but the only point I can gather from what was written about it in the issue stated is that it contains a number of things decidedly objectionable to the reviewer,—who tacitly admits he is a dyed-in-the-wool "psychoanalyst." He discloses that there is a "phalanx of authorities in neurology who do not accept the concept of the unconscious," but he neatly disposes of all such poor, benighted heathen by conclusively asserting: "(Such an one) either shows his own ignorance of the science or betrays his own emotional resistance toward certain of its fundamental considerations." And that's that! Right clever casuistry, what! I'll say! And yet the reviewer touchily objects to Dr. McBride's referring to "psychoanalysis" as a cult!

Among the citations of sceptical neurologists the reviewer holds the omission of the name of Dr. Head as significant, and quotes from Professor Head; but certainly the quotation is not a fortunate one for the reviewer,—in fact, it rather denies his thesis.

The reviewer says a "statistical proof (!) of psychoanalytic therapy . . . was published some years ago." And where was this "proof" published? Oh, innocent one, in the *Psychoanalytic Review*, of course. Of course, where else? Similar "proofs" of any tenet held can be found voluminously in the particular publication devoted to the propagation of the cult. (The word "cult" is used by dictionary permission.) But of what scientific value is such "proof"?

The reviewer says: "He makes the error of confusing the latent content of the dream with the analyst's interpretation, instead of the free associations of the dreamer." But one has only to glance casually at psychoanalytic literature to realize that the so-called "latent content of the dream" consists of a series of postulates originating in the "free associations" of a series of "analysts."

Mr. Editor, out of respect for your readers, please do not select rabid partisans for the reviewing of controversial literature.

Yours very truly,
A. D. Bush.

Emory University, Georgia.

## MISCELLANY

### MAINE STATE DEPARTMENT OF HEALTH

Infectious Diseases Reported for the Week Ending
November 8, 1924

*Chickenpox*

| | |
|---|---|
| Bangor | 4 |
| Brunswick | 1 |
| East Millinocket | 2 |
| Greenville | 2 |
| Lewiston | 4 |
| Machias | 1 |
| Norway | 3 |
| Topsham | 10 |
| Waterville | 2 |
| Winslow | 1 |
| | 30 |

*Diphtheria*

| | |
|---|---|
| Lewiston | 1 |
| Mexico | 5 |
| Milford | 1 |
| Orono | 1 |
| Raymond | 1 |
| Waterville | 1 |
| Westbrook | 1 |
| Winslow | 1 |
| | 12 |

*German Measles*

| | |
|---|---|
| Randolph | 1 |

*Gonorrhea*

| | |
|---|---|
| Bangor | 3 |
| Biddeford | 1 |
| Madawaska | 1 |
| Norway | 1 |
| Portland | 29 |
| Sanford | 1 |
| West Bath | 1 |
| West Kennebunk | 1 |
| Woodland | 1 |
| | 39 |

*Influenza*

| | |
|---|---|
| East Millinocket | 2 |
| Greenville | 1 |
| | 3 |

*Measles*

| | |
|---|---|
| Ellsworth | 2 |
| Greenville | 1 |
| Lewiston | 3 |
| | 6 |

*Mumps*

| | |
|---|---|
| Bath | 1 |
| Biddeford | 20 |
| Dixfield | 5 |
| Millinocket | 12 |
| South Portland | 5 |
| Waterville | 4 |
| | 47 |

*Pneumonia*

| | |
|---|---|
| Bradford | 1 |
| Concord | 1 |
| Gardiner | 1 |
| Machias | 1 |
| | 4 |

*Poliomyelitis*

| | |
|---|---|
| Mariaville | 1 |
| Poland | 2 |
| | 3 |

*Scarlet Fever*

| | |
|---|---|
| Albion | 5 |
| Auburn | 1 |
| Biddeford | 2 |
| Bristol | 1 |
| Bucksport | 2 |
| Friendship | 1 |
| Gardiner | 3 |
| Lewiston | 1 |
| Milford | 1 |
| Orono | 4 |
| Presque Isle | 6 |
| Shirley | 1 |
| Surry | 2 |
| Thomaston | 1 |
| Topsham | 1 |
| York | 1 |
| | 33 |

*Syphilis*

| | |
|---|---|
| Bath | 1 |
| Biddeford | 1 |
| Milo | 1 |
| Portland | 15 |
| | 18 |

*Tuberculosis*

| | |
|---|---|
| Clinton | 1 |
| Freeport | 1 |
| Lewiston | 2 |
| Madison | 1 |
| Milo | 1 |
| Readfield | 1 |
| Sanford | 1 |
| Waterville | 2 |
| Wilton | 1 |
| Winslow | 1 |
| | 12 |

*Typhoid Fever*

| | |
|---|---|
| Canaan | 1 |
| Eagle Lake | 1 |
| Farmington | 1 |
| Portage Lake | 1 |
| Wallagrass Pl. | 2 |
| Winter Harbor | 1 |
| | 7 |

### CONNECTICUT DEPARTMENT OF HEALTH

Weekly Morbidity Report for the Week Ending
November 8, 1924
(Including all cases reported before 11 A. M., Monday, November 10, 1924)

*Diphtheria*

| | |
|---|---|
| Fairfield County | |
| Bridgeport | 6 |
| Fairfield | 2 |
| Shelton | 1 |
| Stamford (C) | 1 |
| Stratford | 7 |
| Westport | 1 |
| Hartford County | |
| Bristol | 1 |
| Hartford | 3 |
| New Britain | 7 |
| Plainville | 1 |
| Rocky Hill | 1 |
| Simsbury | 1 |
| Wethersfield | 1 |
| Litchfield County | |
| Litchfield | 1 |
| North Canaan | 1 |
| Washington | 4 |
| Middlesex County | |
| Chester | 1 |
| New Haven County | |
| Ansonia | 4 |
| Meriden (C) | 1 |
| Wallingford (B) | 1 |
| Waterbury | 7 |
| New London County | |
| Bozrah | 2 |
| Norwich (C) | 4 |
| Tolland County | |
| Tolland | 6 |
| Windham County | |
| Killingly | 2 |
| State total | 67 |
| Last week | 50 |

The following diphtheria bacilli carriers were reported:

| | |
|---|---|
| Bristol | 1 |
| Hartford | 1 |
| Madison | 3 |
| New Haven | 11 |
| Stratford | 3 |
| Westbrook | 1 |

*Smallpox*

| | |
|---|---|
| New London County | |
| Stonington | 1 |
| State total | 1 |
| Last week | 3 |

*Scarlet Fever*

| | |
|---|---|
| Fairfield County | |
| Bridgeport | 10 |
| Fairfield | 1 |
| Greenwich | 1 |
| Shelton | 1 |
| Stamford (C) | 5 |
| Wilton | 1 |
| Hartford County | |
| Berlin | 2 |
| Bristol | 5 |
| Hartford | 6 |
| Manchester | 1 |
| New Britain | 15 |
| Plainville | 1 |
| West Hartford | 1 |
| Litchfield County | |
| Barkhamsted | 1 |
| Litchfield | 2 |
| Thomaston | 10 |
| Middlesex County | |
| East Hampton | 1 |
| Middletown (C) | 3 |
| Middletown (T) | 1 |
| New Haven County | |
| East Haven | 2 |
| Guilford | 1 |
| Madison | 1 |
| Meriden (C) | 2 |
| New Haven | 17 |
| Orange | 3 |
| Seymour | 3 |
| Waterbury | 6 |
| Windham County | |
| Putnam (C) | 6 |
| Putnam (T) | 1 |
| State total | 110 |
| Last week | 54 |

*Typhoid Fever*

| | |
|---|---|
| New Haven County | |
| Wallingford (B) | 1 |
| Windham County | |
| Danielson | 1 |
| State total | 2 |
| Last week | 1 |

*Measles*

| | |
|---|---|
| Middlesex County | |
| East Hampton | 1 |
| New Haven County | |
| New Haven | 4 |
| State total | 5 |
| Last week | 4 |

*Whooping Cough*

| | |
|---|---|
| Fairfield County | |
| Fairfield | 2 |
| Greenwich | 10 |
| Stratford | 1 |
| Hartford County | |
| East Hartford | 1 |
| Enfield | 1 |
| Hartford | 3 |
| Southington | 20 |
| West Hartford | 1 |
| New Haven County | |
| Cheshire | 21 |
| Meriden (C) | 1 |
| New Haven | 7 |
| Prospect | 6 |
| Seymour | 1 |
| Wallingford (B) | 1 |
| Waterbury | 4 |
| New London County | |
| New London | 11 |
| Windham County | |
| Chaplin | 2 |
| State total | 93 |
| Last week | 53 |

*Other Communicable Diseases*

| | |
|---|---|
| Cerebrospinal men. | 1 |
| Chickenpox | 35 |
| Conjunctivitis inf. | 1 |
| Encephalitis epid. | 1 |
| German measles | 3 |
| Influenza | 3 |
| Mumps | 14 |
| Pneumonia (lobar) | 31 |
| Poliomyelitis | 1 |
| Septic sore throat | 4 |
| Tuberculosis (pul.) | 36 |
| " (other forms) | 4 |
| Gonorrhea | 48 |
| Syphilis | 40 |

## THE MASSACHUSETTS CONFERENCE OF SOCIAL WORKERS

This conference at its twenty-first session at the New Ocean House, Swampscott, November 11, 12 and 13, included four different but related groups with papers and discussions. These were, a conference on the problems of illegitimacy, a round table discussion of educational problems of the child with venereal disease, the conference proper and a demonstration of the health activities of the city of Lynn.

The first-named of the sessions was called to order on Tuesday afternoon, Nov. 11, with Miss Ora Mabelle Lewis in the chair, who explained that it had become the custom of the child workers to have a session with the larger conference. The first speaker was Judge Arthur Stone of East Cambridge, who sketched the legal side of the matter quite fully and in terms easily to be understood by any audience. Under the old common law of England the illegitimate child had no legal existence and no rights. It could not inherit property and any that it acquired reverted at its death to the state. With some modifications this idea dominated legal procedure here till the Massachusetts law of 1913, commonly termed "the bastardy law." Formerly all that could be done in this state was to collect $300 from the father which in general was spent by the mother before the baby could get any benefit.

The various points emphasized by Judge Stone were, first, to get a sound view of the matter of the illegitimate child question. First of all to remove stigma from the child, against whom prejudice is held even now. The act of 1913 was characterized again and again, "purely an act of economic justice." It is not a punishment for the man nor compensation for the woman, but a matter of support for child and mother. It is in a way also a safeguard for the State, on which the support of such children not infrequently falls.

Some of the points were for the special instruction of social workers, and it was noted that the procedures under the law of 1913 are criminal and not civil. The reason for this is that it ensures quicker action, secures a better hold on the man and a more certain fulfilment of the financial requirements. The State has charge of the prosecution from end to end, and where formerly money paid over ended the matter, the Court now is administrator, and transactions are through it.

Developing this portion of the subject, Judge Stone outlined some of the difficulties in securing payments from the men, among which are, unwillingness to do anything, lack of sufficient money, absolute inability to earn, moral slackness and real inability, mental or physical. Turning to the problems on the part of the mother, the speaker included among them, immorality, lack of mental capacity and ignorance. The remedy is the rehabilitation of the mother. The father, it would appear, seems to be not an important factor here, but the woman is always a subject for rehabilitation.

In concluding his address Judge Stone suggested that it is wise to have the burden of the support of the child divided between father and mother, and he deems it not wise to have the mother of an illegitimate child feel that she can have full support for herself and it. The speaker answered many questions concerning the legal difficulties in the matter and the current customs of his and other courts.

In discussing this subject. Arthur L. Stevenson of the Department of Public Welfare referred to the fact that some mothers have had a questionable past, and some even continue to give birth to illegitimate children, and considered this matter in its relationshps to procedure; he differed from the previous speaker in the advisability of police action against the man until he had had an opportunity to tell his side of the story.

The second event of the conference was a round table discussion of some educational problems of school children handicapped by venereal disease. Commisisoner Eugene R. Kelley of the Massachusetts Department of Public Health was in the chair, and in his opening remarks spoke of congenital syphilis and gonorrhea in children as matters on which much is needed towards a better understanding. Not only should physicians become better informed in their consideration of such cases, but there is much to do in the education of the people themselves. More than a dozen speakers told briefly stories out of their own experiences, while Dr. Kelley emphasized the salient points as they were brought to view. Miss Jessie M. Hume of the Massachusetts Eye and Ear Infirmary related the problems with a girl almost blind and almost deaf with congenital syphilis, who through careful study and continuous effort was so far bettered as to be able to keep up her grades in school. Miss Hume emphasized a number of points, first, congenital syphilis is not infectious and should not be a cause for excluding a child from school. "It is very necessary to fight this fallacy which has injured many children." Treatment is hopeful under close follow-up. The case in question was from another state, and Miss Hume drew from this the importance of coöperation of different agencies, and as aids in securing good results she advised a thorough medical examination, and since long and persistent treatment by the parents will be necessary, she urged social workers to use every means to bolster up the courage of these parents. Miss Elizabeth Bryant of the Massachusetts Psychological Hospital spoke of a boy of eight years who was disobedient, destructive and tyrannical. Five years of treatment and follow-up made of him a normal boy, mentally and physically. A third case of betterment in congenital syphilis was noted by Miss Carrie Grant of Boston Dispensary, in which the benefits of a foster home were outlined. Here Dr. Kelley spoke of the courage of a family in taking a child of the kind with the knowledge of the necessary work in treatment and reporting to the dispensary.

Turning to the subject of gonorrhea in children Miss Amy Smith of the Boston City Hospital spoke of a case with a background of large family in close quarters with the parents negative to the importance of treatment and the mother's attitude partly reflected in the child. She emphasized the value of public health nurses as health teachers in the home. Mr. E. P. Stanton of the Health Department of Boston pointed out one difficulty. In finding diseases of this nature in children who become non-infectious, the boards have in such cases no power to act, since they do not come under the classification "dangerous to the public health." He said his board would welcome suggestions for a regulation that would meet the need.

Speakers representing the Department of Public Welfare with its Bradford Infirmary, Children's Aid Society, Society for the Prevention of Cruelty to Children, and the Cambridge Hospital, gave bits of personal experience and the session was closed by a short outline by Dr. M. E. Champion of the Massachusetts Department of Public Health of the difficulties of the school physician in handling the diseases under consideration, since they are called in to act only in cases of acute difficulty. The school nurse has usually the responsibility, and these factors make the school problem very complicated.

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The regular conference opened on Tuesday evening, Nov. 11, with a dinner at the New Ocean House, Swampscott, following which were three important papers, The Massachusetts Child Health Program by Commissioner Kelley of the Massachusetts Department of Public Health, The State's Program for Juvenile Tuberculosis Prevention by Dr. Henry D. Chadwick and The Child Hygiene Program of the Federal Government by Miss Grace Abbott, Chief of the Children's Bureau, Washington, D. C.

In his address Commissioner Kelley summed up the general program of the State in these words: "In particular, we are just at present stressing certain specific features in Massachusetts because they seem supremely practical and full of promise for the next generation. I am inclined to list the State-wide interest in our attempt to prevent the early infections of childhood with the tubercle bacillus from becoming the adult scourge of consumption, as the unique feature of our present program. The rapid growth of pre-natal hygiene and of well-baby clinics throughout the State are two other significant signs of the times in this field. The present rapid spread of dental hygiene activities, of nutrition classes, and of health instruction in public schools, are also very hopeful features of our child hygiene campaign. Quickening interest in such subjects as habit clinics and the mental hygiene of the young, in supervised recreation and physical education are other evidences which show plainly how strong the current is setting in the direction of the conservation of child health in our several communities."

"The most significant and in the last analysis the most hopeful sign of all is the awakening of individual parents to their own responsibilities in these matters," said Dr. Kelley in closing, and he presented illustrations through interest in clinics, activity in the campaign against diphtheria and the like. "Massachusetts is not asleep in regard to her responsibilities in the matter of conservation of her children's health and mentality."

The program of the State in the prevention of juvenile tuberculosis is pretty well known by medical men, but the presentation by Dr. Henry D. Chadwick, who is to be the leader in the work, gave it some new interests. He spoke of the philosophy of prevention; the attack of the problem in childhood, when the disease is in the incipient stage and the outlook is favorable; he sketched the modern view of tuberculosis with its three types, infantile, juvenile and adult; and asserted that the glandular, or childhood type is relatively easy to control. For this control there are necessary plenty of fresh air and sunshine, careful regulation of physical activities, ample hours of sleep and care in the child's nutrition. Dr. Chadwick quoted his experiences at Westfield in support of the belief that eight to ten percent of underweight children show definite signs of glandular or "hilum" tuberculosis. The State is therefore making examinations of certain groups of children, those ten percent underweight, contact cases and a smaller group of special cases, whose physical condition is unsatisfactory.

The results to be expected are, early discovery of disease and institution of treatment, reduction in the number of malnourished children with increased resistance in them and through the clinics the discovery of other physical defects. A result of these findings and the treatment of those who need it will result in a lower mortality from tuberculosis and a substantial decline in the number of children who are obliged to repeat grades in school. Some details of the proposed procedure were given for the especial benefit of the social workers, and the economic features resulting from more perfect men and women were emphasized.

In her outline of the program of the Children's Bureau, Miss Grace Abbot enunciated the broad principle of making it possible for all children to arrive at maturity with the fullest possible development of all their capacities. As means to this end the Bureau undertakes scientific research, placing the results of this within the reach of experts and the general public, and effecting coöperation with states and communities in promoting the health of mothers and children.

An example of the research work is the "three-year rickets demonstration," now under way in Connecticut. It is a study of fundamental importance, since it is estimated that three-fourths of the children in the country have rickets in slight or in serious form. In the district in which the study is being conducted a nurse visits the home of every baby born and invites the mother to bring the baby to the clinic for examination. She is taught there the necessity of sunlight and the value of cod liver oil in the dietary.

A posture-training investigation is another example of the research work. In its educational efforts the Bureau has issued more than one million publications each year and has received and cared for about 100,000 individual letters. Cooperation with the States in promoting the health of mothers is carried on under the provisions of the Federal Maternity and Infancy Act.

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On Wednesday morning, Nov. 12, under the chairmanship of Mrs. Ada Eliot Sheffield, Director of the Research Bureau on Social Case Work, Boston, the conference took up some of the questions between institutional care and that of the agency. The chairman explained that after discussions had settled a matter and it had been considered so settled for a term of years, it is often profitable to take it up again in the light of possible changes of opinion in the meantime.

Mr. Alfred F. Whitman, executive secretary of the Children's Aid Society, Boston, took up the matter of institutional care. He first noted that oftentimes child-placing agencies have little knowledge of what the institutions are doing and the institutions likewise may not know just what the agencies effect. The discussion settled itself at once into one largely concerning these special placing agencies and much was said in comparing the foster home with the institution. The speaker intimated that Massachusetts has to a very considerable extent given up the endowment of such institutions, under the belief that children are better off in the hands of agencies. Comparisons were made with similar movements in other states. In New York, for example, there was a decrease of one-sixth in the number of children placed in 1922 against 1915, notwithstanding the increase in population in this time. Then, again, institutions may be left behind in the march of improvement, while some are seriously handicapped by various limitations, oftentimes with reference to the expenditure of certain funds.

It is necessary to find out what are the needs of the community, what is the best kind of service for it and whether there may be a sufficiently large number of foster homes available. Institutions may at times serve for temporary care of the children. The speaker referred to the general situation today as seemingly a great national change, and emphasized the advantages of placing children in homes. The agencies were advised to coöperate with Kiwanis, Rotary Clubs, Lions, etc., and the Legion, all of which organizations have great interest in the problems of children.

The second speaker on the subject was Miss Anne P. Hincks of the Bethesda Society, who noted first that few institutions are so flexible that after a long period of time they can go on without some readjustments, and as a matter of experience she related how her own society has changed some of its methods. Questioning what makes some children difficult, she set forth five causes; poor environment, poor heredity, malnutrition, maladjustment and neglect. Institutions suffer from much the same handicaps, in environment, for example, with a poor location for its buildings and failure to keep up the necessary community contacts. Poor heredity is a handicap and is evidenced when an institution is of the older form and inherits traditions of antiquated methods and procedure no longer up to date, instead of interpreting the spirit of the founders in terms of today. Malnutrition is evident when an institution is trying to maintain itself on a fraction of a budget commensurate with its undertakings, or when its funds are badly distributed. Maladjustment is where the institution has lost its real sense of service to its community, and is uncertain as to what its functions are, and neglect is that condition which ensues when it is not intelligently used by welfare organizations. Some of the advantages of a institution over placing in a foster home were related from her own point of view and Miss Hincks said that a girl in an institution can understand the reason for giving service, whereas in a foster home she may feel misunderstood or overworked. There is an advantage of one set of standards during the period of re-education. She noted an example of a girl in the first home who was rather encouraged to go to the pantry whenever she wished, and in a second home was found fault with for taking a pickle out of a jar in the pantry. Such differences in individual homes extends also to matters bearing on moral conduct. The girl in the home is likely to seek poor associations for the reason that she is not acceptable to the better element, yet seeks companionship. Then again the girl in the institution has a definite sense of belonging to something.

The fundamental question is not, is it an institution, but what kind of an institution is it? Has it some direct and vital relationships to community needs?

With the paper of Marion E. Kenworthy,

M. D., of the Bureau of Children's Guidance, New York City, the formal proceedings of the morning came to a close. The discussion was a scholarly consideration of mental problems that was notable in every sense. In older days students of mentality concerned themselves very largely with classifications; psychiatry seeks to study the elements within individuals. The study of adult groups has pointed to the need of study of the child, and the fact is impressed on the student that mental unadjustments usually begin in childhood. This emphasizes the necessity of early discovery of the beginning of these maladjustments. It is increasingly important to make public the results of investigations in these fields, and with coöperation which other workers can extend, splendid results must come. The paper presented many interesting facts, for example, that the dull child, the normal and the superior one may all of them react to unfortunate environment. Each case must be approached by itself and no standards exist as yet for any other line of procedure.

In the discussion, Mr. Saul Drucker, formerly Superintendent of the home of the Jewish Charities in Boston, found in his experience that institutions and agencies have both of them places in the community and are both accomplishing good work. Mrs. Laura Goss, Secretary of the Child Welfare Home in Lynn, outlined the agencies that were combined in the formation of this active community force. In summing up the arguments, the chairman, Mrs. Sheffield, called attention to three needs, a program in Massachusetts in which both institutions and agencies shall be included, better observations of what the institution does for the child, and that all social workers have some measure of psychiatric training. Resulting from various suggestions it was voted by the conference that the chairman of the morning be authorized to appoint a committee to consider a program for welfare organizations.

The program of Wednesday afternoon was tied in to health mostly through the fact that relief officers in Massachusetts are expected to consider the health and education of the children. Mr. Edmund A. Whitman, Overseer of the Public Welfare in Cambridge, spoke of the future of the Republic as being in the bodies of the children, and discussed at some length the legal aspects and the amount of relief towards health and education that might be possible. He would himself "Go the limit." He asserted his opinion that such relief ought to cover even special medical attention if the condition of the child required it.

Mr. Walter V. McCarthy, secretary of the Overseers of the Public Welfare of Boston, noted that the funds of a department like the one he represented could not be administered without considering health and education. "Sufficient aid should be furnished," he said, "to enable mothers of dependent children to bring them up properly in their own houses. This must mean a consideration of health and education, not only physical health but mental." In Boston the effort has been made to better health conditions by moving families, when practicable, to less crowded quarters. The board has made an effort to have medical examinations of children when the family first comes to the attention of the department. Relief officers must realize the necessity of caring for the health of the families receiving aid, defective teeth, eyesight, tonsils, etc., should be treated and, if necessary, hospital or sanitorium care. The health of the children is in their keeping. Prevention is more economical than attempts to put the sick persons on their feet.

In the discussion Mr. Gerhard Becker of Worcester emphasized the need of case work with mother and children. In his department all the families aided were given an opportunity to move from the basement tenements they occupied. "Other families have taken their places," said the speaker, "but although they should not, we have no authority over them."

At the Conference of last year a committee was appointed on existing working agreements between public and private agencies. Mrs. Carrie A. Hull, general secretary of the Newton Welfare Bureau, reported for this committee, with recommendations on the importance of case work and constructive planning, adequate relief when any is given, establishment of a social service exchange in every community and of a council to meet at regular times to discuss local problems.

The principal medical ideas brought out at the session of Wednesday evening were presented by Douglas T. Thom, M. D., director of Division of Mental Hygiene, State House, Boston. The new psychology has made a new approach possible to the problems of mental health and the problems themselves have taken on new aspects. Heredity colored opinions for a decade up to about five years ago, with rather a fatalistic tinge obstructive to progress. Modern experiments show that the germ plasm may be affected by external influences. There are an unlimited number of pathological conditions which may affect the nervous system and result in mental ill health.

Contrasting older methods Dr. Thom instanced the boy shipped to a reformatory for some minor offence, and a second offence might take him to jail for a post-graduate course in criminality. Today the same lad is considered by the psychiatrist, the social worker and the probation officer, all in the light of recent knowledge. He warned enthusiastic workers against two pitfalls, first, the making of individual cases to conform to a standard pattern of what the theoretical child should be, and, second, the attempt to classify all into definite types. With present limited knowledge, we can not af-

**ford to vitiate results of painstaking investigation by formulating set ideas.**

**Classifying some of the causes for feelings of inferiority, he spoke especially of physical handicaps, intellectual handicaps and those that are racial and the environmental factors. He emphasized the complexity of interrelationship between underlying motive and conduct and spoke of the danger of reaching hasty or even injurious conclusions. It should be borne in mind that mental hygiene is no panacea; it is a means of great value, but not everything.**

The pre-school period is one to be particularly watched. It is shown that seventy-five percent of speech defects begin before the age of six years and fifty percent of chronic convulsive disorders before the age of four. It is likewise true, although not yet subject to statistics, that feeble-mindedness manifests itself early in childhood and delinquency is characteristic in infancy.

It is important to be watchful through the period of childhood, and this is the more easy in view of the current great interest in the child. Psychiatrists should look to it that real facts are being utilized. In the re-evaluation of psychic problems as well as some of those of medicine, highest praise is due the social worker.

The three sessions of Thursday included a business meeting, a discussion of selected topics in the Massachusetts program and a résumé at the farewell luncheon, but these were mostly considerations from the legal and administrative points of view.

The Conference was extremely successful, the registration rising above five hundred.

## SOUTHWEST ANNUAL FALL CLINICAL CONFERENCE

The Kansas City Clinical Society and the Medical Association of the Southwest held their annual fall clinical conference at Kansas City, October 13-18, 1924, in conjunction with the second annual meeting of the American Child Health Association. The conference was attended by over eighteen hundred physicians of the southwest.

The mornings were devoted to clinics, motion pictures, lantern slides and demonstrations at the various hospitals and at Convention Hall, the headquarters of the Conference. The afternoons were given over to scientific programs with meetings addressed by visiting physicians from all parts of the country.

On Tuesday evening a joint public meeting with a very large attendance was held at Convention Hall, at which Dr. George E. Vincent, President of the Rockefeller Foundation, New York, gave an address on "The Doctor of the Future," laying especial emphasis upon the changing responsibilities of the general practitioner. On Thursday afternoon there was also a joint scientific session.

On Wednesday evening alumni dinners were held with representatives from many of the leading medical schools. Harvard had thirteen alumni present, and there was a genuine interest in the development of the medical school and enthusiasm for what was being accomplished for medical education.

The American Child Health Association re-elected Mr. Herbert Hoover as President for another year.

The sessions of the Association were largely attended. The subjects for discussion dealt mostly with the training of workers for health work and the problems of such workers in the field. Dr. Elliott P. Joslin of Boston read a paper on The Treatment of Diabetes and Its Complication, With and Without the Use of Insulin, and Dr. Richard M. Smith of Boston one on Tuberculosis in Infants and Children.

## WACHUSETT MEDICAL IMPROVEMENT SOCIETY

The Wachusett Medical Improvement Society held its meeting at Holden District Hospital on the evening of November 5th.

After a substantial banquet served by the Nursing Staff of the Hospital, the meeting was called to order by the President, Dr. F. H. Washburn. The usual routine business was transacted and interesting cases reported by several members of the Society.

Dr. Arthur Kimberly read a most excellent paper entitled: "Birth Injuries." He described the anatomy of the skull and its adaptation of the birth canal and described the injuries which may befall it. He cited the fact that the birth mortality has markedly decreased of late.

A very excellent paper on the "Care of the Premature Infant" was read by Dr. F. L. Storey. He considered the premature infant not only the one born three weeks before the normal term, but the infant which, for one reason or another, was not able to maintain its weight.

The papers were freely discussed.

The next meeting of the Society will be held on December 3rd at the Holden District Hospital, Holden, Mass. The Society will be favored by a paper by Dr. J. W. O'Meara of Worcester, entitled: "Sacro-Iliac Strain." Also a paper by Dr. R. S. Perkins of Worcester, entitled: "Treatment of Fractures of the Femur."

## MEETING OF THE HARVARD MEDICAL SOCIETY

The Harvard Medical Society met Tuesday evening, Nov. 11th, in the amphitheatre of the Peter Bent Brigham Hospital. A case of anthrox was demonstrated. Only four cases of this rare disease have been treated in the history of the hospital. Anti-toxin treatment produced striking beneficial effects.

An address by Dr. Whittaker followed, on the use of sodium tertraiodophenolphthalein in biliary cystography. He explained a series of experiments on animals that demonstrated the advantage of this salt over the analogous Bromine compound. He found that the amount of the Iodine salt necessary to produce a satisfactory shadow of the gall bladder is only half the amount of the Bromine salt required. On the other hand the two salts seem to be about equal in their toxic effects. However, the fact that the Bromine salt must be given in doses only slightly less than the fatal dose, makes its use more or less dangerous. The Iodine salt can be given in half the dose with the same desired effects, but with a far greater margin of safety.

Dr. Milliken, the next speaker, described the clinical use of the Iodine salt. He explained the intravenous method of administration, pointing out the precautions that must be observed. He also showed reprints of radiographs from patients to whom the salt had been given. These have proved very helpful as a method of diagnosis in doubtful cases of gall bladder lesions. In the future it may become a deciding factor in the diagnosis of such lesions.

A short discussion followed, after which Dr. Cushing gave an interesting account of the early history that led to the founding of the Western Reserve Medical School in Cleveland, Ohio.

## THE SURGICAL SECTION OF THE SUFFOLK DISTRICT

The Meeting of this Section of the Suffolk District Medical Society in conjunction with the Middlesex South, Boston Medical Library, was held at the Medical Library, November 12, 1924.

The paper of the evening, "The Intravenous Use of Mercurochrome 220-Soluble in Septicaemia and Allied Conditions," was read by Dr. Edmund B. Piper of Philadelphia.

Dr. Piper, who was the first to use mercurochrome intravenously in septicaemia and similar conditions, gave a most interesting account of his experiences with this drug, including both his successes and his failures. He ended his talk with an emphatic plea against the indiscriminate and unscientific use of the drug. The paper was well discussed by several Boston men who gave their experiences in the Boston hospitals. The meeting was well attended and a lively interest was shown.

## THE FRANKLIN DISTRICT SOCIETY

The November meeting of the Franklin District Medical Society held at The Weldon, Greenfield, on Nov. 11, proved one of the most interesting sessions held for years.

The attendance was large, the enthusiasm great and the quality of the papers unusual.

Dr. A. E. Johnson, Jr., of Greenfield read a paper entitled "Hypertension from the Viewpoint of the General Practitioner." The reader covered the subject thoroughly and cited cases illustrating various points.

The discussion was as interesting as the paper. Every member present took part—in fact the discussion was so prolonged that the second paper was necessarily shortened.

Dr. H. B. Marble of Shelburne Falls presented as his subject, "The General Practitioner and the Laboratory."

Owing to the lateness of the hour the doctor shortened his paper giving the out-standing facts. It is hoped that this paper may be presented in its entirety at the next meeting.

Chas. Moline, *Sec.*

## FAR WESTERN CHILD HEALTH DEMONSTRATION

The American Child Health Association announces that Marion County, Oregon, has been selected as the field of the fourth demonstration in the Commonwealth Fund Child Health Demonstration. Earlier demonstrations are now under way in Fargo, North Dakota; Athens, Georgia; and Rutherford County, Tennessee.

The selection of Marion County was made after careful consideration of applications from more than 30 cities and counties in the 11 western states which made application to the committee. Its population, estimated at 55,000 in 1924, is 90 percent American born. Salem, the state capital, and the largest city in the county, has a population of 25,000, denoting the rural character of the county. A perplexing child health problem is presented by the migratory labor population, variously estimated, in Marion County, at from three to ten thousand.

The Salem School Board has offered the Demonstration headquarters and maintenance and upkeep are assured by the Civic Club of the city. Moreover, early establishment of a full-time county health unit has been pledged by the citizens of the county, whose purpose it is to increase the county appropriations for child health each year, until, at the end of five years, they will have taken over the responsibility for the complete program.

## THE MASSACHUSETTS PSYCHIATRIC SOCIETY

The first annual meeting of the Massachusetts Psychiatric Society was held at the Boston Psychopathic Hospital on November 18th.

The following officers were elected for the ensuing year:

President—Walter E. Fernald, M. D.
Vice-Pres.—Geo. M. Kline, M. D.
Sec. and Treas.—Ralph M. Chambers, M. D.
Councillors—William Healey, M. D., and Frederick Packard, M. D.

The topic for discussion was "Responsibility." Dr. Abraham Myerson presented The Medical Point of View and Mr. J. H. Beale, Royall Professor of Law, Harvard University, presented The Legal Point of View. The papers were discussed by Dr. Wm. Healey, Dr. Sheldon Glueck, Dr. Morton Prince, Judge Arthur P. Stone and Dr. James V. May.

After the meeting those present were treated to a buffet luncheon.

## NEWS ITEMS

### HARVARD MEDICAL SOCIETY

A meeting of this society was held in the Peter Brigham Hospital Amphitheatre (Van Dyke St. entrance), Tuesday evening, Nov. 25, 1924, at 8.15 o'clock.

PROGRAM

1. Demonstration of cases.
2. The Epidemiology of Infantile Paralysis—Dr. W. L. Aycock, Dept. of Preventive Medicine, Harvard Medical School. Discussion.

### APPOINTMENT OF DR. ALBERT PFEIFFER

On November 30th Dr. Albert Pfeiffer will leave the Massachusetts Department of Public Health, where he has been serving as Chief of the Division of Venereal Diseases, to accept the position as Director of the Division of Venereal Diseases in the New York State Department of Health.

Dr. Elliott Gray Brackett, of Boston, read a paper on "The Rise and Development of Orthopedic Surgery" before the New York Academy of Medicine on November 20th.

Appointments—Dr. Jos. E. Sternberg and Dr. William D. Rowland have been appointed Assistant Professors in Clinical Ophthalmology in the Boston University School of Medicine.

## The Massachusetts Medical Society

Massachusetts Medical Society.—The annual meeting of the four Western Districts of the Massachusetts Medical Society was held at Hotel Kimball on Tuesday, November 25.

Luncheon 1 P. M.

Following luncheon there was a short business meeting with election of officers for the ensuing year.

Dr. T. J. O'Brien, Secretary of the Committee on State and National Legislation, Massachusetts Medical Society, spoke on legislative matters that are of interest to Fellows.

This was followed by a paper: "Surgery of the Stomach," by Dr. Daniel Fiske Jones of Boston. Discussion followed.

A. P. Merrill, *President.*
H. L. Smith, *Secretary.*

Beverly Hospital, Beverly, Mass.—A demonstration clinic was held at the Beverly Hospital Tuesday, November 18, at 4 P. M. The following cases were shown and discussed: Fracture, simple, right femur (2 cases); Fracture, simple, left femur (2 cases); Exophthalmic goitre; Tuberculosis of skin (lupus); Intestinal obstruction (carcinoma of intestine); Diabetes mellitus. Doctors were present from Beverly and surrounding towns.

Boston Medical History Club held its regular meeting at the Boston Medical Library Monday, November 17, 1924.

PROGRAM

1. Exhibition of Statuette of General Warren. By Dr. Timothy Leary.
2. Extra Illustrated Copy of Mumford's History of Medicine in America. By Dr. John T. Bottomley.
3. The Story of the Staniford Street Dispensary in Boston. By Dr. J. W. Farlow.
4. The Life and Times of Hippocrates. By Dr. Fred B. Lund.

### DR. GEORGE L. RICHARDS WILL VISIT INDIA

Dr. Richards, who has spent considerable time in medical work in the Near East and India, is about to visit Southern India again. He will give clinical and didactic lectures on otolaryngology at three different mission medical schools in India.

The first course will be at the Union Medical School for Women at Vellore, South India, the dean of which is Dr. Ida Scudder. The second will be at the Mission Medical School of the American Presbyterian Mission at Miraj in West Central India, and the third at the Women's Christian Medical College at Ludhiana in the Punjab, North India, Dr. Edith A. Brown, Dean. For this purpose he is taking charts, dry specimens and a sufficient amount of operating paraphernalia and hopes to give about two weeks in each place or to furnish as nearly as possible the equivalent to what the average undergraduate gets in disease of the ear, nose and throat.

When in India two years ago, he found this department of medicine rather poorly taught and it is with the idea of stimulating and helping in the teaching of this department that he is going. He will write a letter to the Journal giving his experiences as a teacher after finishing the course at the first medical school.

### THE NORFOLK DISTRICT MEDICAL SOCIETY

A REGULAR meeting of the Society was held November 25, 1924. Subject of the paper read: Diabetes—Insulin, Dr. Elliott P. Joslin.

BOSTON UNIVERSITY SCHOOL OF MEDICINE.—Dr. Frederick Barry of Columbia University gave to the students of the Medical School of Boston University a most interesting talk on the historical approach to the study of science.

In broad, general terms he outlined the various habits of thought which progressive civilization has engendered in the human race. Recognizing that man's earliest reaction to natural phenomena was the formulation of religion or religious concepts, he traced the growth of the present scientific habit of thought from these earlier beginnings. Emphasis was laid on the necessity of separating the mathematical expression of an idea, remote from perceptual experience and physical analogies in which the relation was apparent and not real. He touched upon certain of the more recent developments in the realm of science, giving interpretations in terms of the several modes of thought.

The general thesis was that, in the study of historical development of any science, it was possible to review the various thought processes which in their entirety and development had led up to our present day concepts, thus compressing into the brief space of time the experience of the ages.

## REMOVALS

DR. BERNHARD STEINBERG has moved from the Psychopathic Hospital, Roxbury, to Cleveland, Ohio, 2109 Adelbert Rd.

DR. A. S. O'CONNOR of Worcester has moved from Grafton St. to 42 Hamilton St.

DR. FRANKLIN H. PERKINS has moved from Newton (Middlesex South) to Lancaster (Worcester).

## NOTICES

A PHYSIOLOGICAL CONFERENCE will be held on Wednesday, December 3, 1924, in the Bowditch Library, Building C, of the Harvard Medical School, at 4 P. M.

Dr. A. V. Bock will speak on "The Circulation Rate in Man."

### NEW YORK SKIN AND CANCER HOSPITAL

ALUMNI NEW YORK SKIN AND CANCER HOSPITAL

Graduates of this Post-Graduate School are requested to send their present professional office addresses to the secretary of the reorganized Alumni Association, Dr. Herman Goodman, 15 Central Park West, New York City.

### LECTURE COURSE

VERY KINDLY ARRANGED FOR US BY POST-GRAD. DEPT. OF HARVARD MEDICAL SCHOOL

(DR. S. R. MEAKER)

THE 1924-25 course of lectures for graduate physicians will be delivered in the lecture room of the Bishop Memorial Training School for Nurses, 742 North Street, Pittsfield, Mass., on Wednesday afternoons at five o'clock.

Nov. 19—Frederick T. Lord, M. D., "Medicine."
Nov. 26—Frederick T. Lord, M. D., "Medicine."
Dec. 3—Frederick T. Lord, M. D., "Medicine."
Dec. 10—Frederick T. Lord, M. D., "Medicine."
Jan. 7—Robert L. De Normandie, M. D., "Obstetrics."
Jan. 14—Frederick C. Irving, M. D., "Obstetrics."
Jan. 21—Francis H. Lahey, M. D., "Surgery."
Jan. 28—Francis H. Lahey, M. D., "Surgery."
Feb. 4—Maynard Ladd, M. D., "Pediatrics."
Feb. 11—Maynard Ladd, M. D., "Pediatrics."
Feb. 18—Robert L. De Normandie, M. D., "Obstetrics."
Feb. 25—Francis H. Lahey, M. D., "Surgery."
Mar. 4—Francis H. Lahey, M. D., "Surgery."
Mar. 11—William H. Robey, M. D., "Cardiology."
Mar. 18—Edwin H. Place, M. D., "Contagious Diseases."

The above program will be followed as closely as possible, but the School reserves the right to change the order should unforeseen circumstances make such change necessary.

A. P. MERRILL, *Secretary.*

### NEW ENGLAND DERMATOLOGICAL SOCIETY

THE regular quarterly meeting of The New England Dermatological Society will be held Wednesday, December 10, in either the Surgical Amphitheatre, or the Thorndike Memorial of the Boston City Hospital at 3.00 P. M.

C. M. CASSELBERRY, *Sec'y.*

### HEALTH UNIT, 17 BLOSSOM ST., BOSTON

YOUR presence is earnestly requested at the monthly meeting of the West End Neighborhood Conference to be held at the Health Unit, Friday, November 28, at 3 P. M. sharp. Mr. Maurice B. Hexter, Executive Director, Federated Jewish Charities, and Mr. Stockton Raymond, General Secretary, Family Welfare Society, will speak on "Correlation of Health and Welfare Work."

This is the most important topic that has been brought before the West End Neighborhood Conference since its organization and is a much debated subject and of particular interest to every health and welfare agency in our district.

In order that we may have a better understanding of this very important work it is imperative that everyone engaging in health and welfare work will make an effort to be present.

Very truly yours,
CHARLES F. WILINSKY, M. D., *Secretary,*
*West End Neighborhood Conference.*

## NOTICE OF EXAMINATION FOR ENTRANCE INTO THE REGULAR CORPS OF THE UNITED STATES PUBLIC HEALTH SERVICE

Examinations of candidates for entrance into the Regular Corps of the United States Public Health Service will be held at the following-named places on the dates specified:

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| At Washington, D. C., | January 5, 1925 |
| At Chicago, Ill., | January 5, 1925 |
| At New Orleans, La., | January 5, 1925 |
| At San Francisco, Calif., | January 5, 1925 |

Candidates must be not less than 23 nor more than 32 years of age, and they must have been graduated in medicine at some reputable medical college, and have had one year's hospital experience or two years professional practice. They must pass satisfactorily oral, written and clinical tests before a board of medical officers and undergo a physical examination.

Successful candidates will be recommended for appointment by the President with the advice and consent of the Senate.

Requests for information or permission to take this examination should be addressed to the Surgeon-General, United States Public Health Service, Washington, D. C.

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## OBITUARY

### GEORGE STANFORD STEBBINS, M. D.

DR. GEORGE S. STEBBINS, a well known physician of Springfield, died at his home in that city, November 14, 1924, at the age of 85. He had practised in Springfield since 1865; joined the State Medical Society in 1868 and was retired in 1905.

He was born in Granby, Oct. 26, 1839, the son of Cyrus and Mary Ann Stebbins, and most of his early life was spent in his birthplace. He was educated in the public schools and Lancaster Academy, after which he went to Berkshire Medical College in Pittsfield and later to Bowdoin College, from which he received his medical degree in 1864. The year previous to his graduation he enlisted in the 46th Massachusetts Regiment, and went to Newbern, N. C., where he was detailed to hospital duty. After his graduation he went to Lincoln Hospital at Washington as assistant surgeon. At the close of the war he settled in Springfield.

Dr. Stebbins was appointed assistant medical examiner of the Massachusetts Mutual Life Insurance Company in 1887, and in 1910, upon the death of Dr. F. W. Chapin, he was made medical director of that company, a position which he held at the time of his death. The Stebbins home at 26 Maple Street, with its gardens of blazing tulips and other flowers, was for decades one of the show places of the city.

Dr. Stebbins was married twice, his first wife being Mary M. F. Dana, whom he married at Lancaster in 1886. His second wife was Elizabeth L. Larrabee of Beverly, whom he married in 1901. Besides his wife, Dr. Stebbins leaves one son, Harold Banah Stebbins of Boston.

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## SOCIETY MEETINGS

### *Essex North District Medical Society*

January 7, 1925. Semi-annual meeting at Haverhill.
May 6, 1925. Annual meeting at Lawrence.

### *Essex South District Medical Society*

Essex South District Medical Society's next meeting will be held Wednesday, December 3, at the Beverly Hospital. 5 P. M., clinic by members of the Staff. 7 P. M., supper. Speaker, Dr. John Homans, Boston, on "The Early Diagnosis of Carcinoma of the Large Intestine."

### *Franklin District Medical Society*

The meetings of the Franklin District Medical Society will be held on the second Tuesday of January, March and May.

### *Hampden District Medical Society*

Meetings to be held on the third Tuesday of January and the third Tuesday in April.

### *Hampshire District Medical Society*

The meetings will be held the second Wednesday of November, January, March and May.

Dr. Channing Simmons will deliver an address at the November meeting. Title: "The Treatment of Cancer, with Especial Reference to Radiation."

### *Middlesex East District Medical Society*

Wednesday, January 21. Harvard Club. Dr. Franklin K. White, "Diagnosis of Gall-Bladder Disease."

Wednesday, March 18. Harvard Club. Dr. John H. Cunningham, "Urinary Retention: Its Significance and Treatment."

Wednesday, April 15. Harvard Club.

Wednesday, May 13. Colonial Inn, North Reading.

### *Middlesex North District Medical Society*

January 28, 1925.
April 29, 1925.

### *Middlesex South District Medical Society*

Winter Schedule—The plans for winter meetings of the Society include the stated meetings in October and April, two hospital meetings, and five meetings to be held in conjunction with the Suffolk District Medical Society and the Boston Medical Library (two surgical, two medical, and one general).

### *Norfolk District Medical Society*

January 27, 1925. Masonic Temple. Subject: "Some Trends of Medical Teaching and Medical Practice." Speakers: Drs A. S. Begg and W. P. Bowers.

February 24, 1925. Masonic Temple. Subject: "The Need of Periodical Physical Examinations and How to Make Them." Speaker: Dr. Francis H. McCrudden. A second speaker will be selected to present another subject at this meeting.

March 31, 1925. Tufts College Medical School. This meeting given over to Drs. Leary and Watters for the purpose of giving us a medical examiners' talk.

### *Norfolk South District Medical Society*

Meetings will be held the first Thursday of each month from October to May, inclusive, at 12 noon, at the Norfolk County Hospital, South Braintree.

### *Suffolk District Medical Society*

December 17. Medical Section, in association with the Middlesex South District Medical Society. "The Newer Drug Treatment of Heart Disease," Dr. Paul D. White.

January 28. General meeting, in association with the Boston Medical Library and the Middlesex South District Medical Society. "Some Experiences of a Medico-legal Pathologist" (lantern slides), Dr. George B. Magrath

February 25. Surgical Section, in association with the Middlesex South District Medical Society. "Pyelonephritis," Dr. Arthur H. Crosbie.

March 25. Medical Section, in association with the Middlesex South District Medical Society. "The Treatment of Pneumonia," Dr. Edwin A. Locke.

April 29. Annual meeting. "Hypertension and Longevity," Dr. Harold M. Frost.

### *Worcester District Medical Society*

December 10, 1924. Worcester State Hospital. Subject and speaker to be announced.

January 7, 1925. Surgical meeting. Place, subject and speaker to be announced.

February 11, 1925. Memorial Hospital, Worcester. Papers will be read by the members of the hospital staff.

March 11, 1925. St. Vincent's Hospital, Worcester. Papers will be read by the members of the hospital staff.

April 9, 1925. Subject and speaker to be announced.

May 14, 1925. Annual meeting.